MARCH 1953

American Engineer

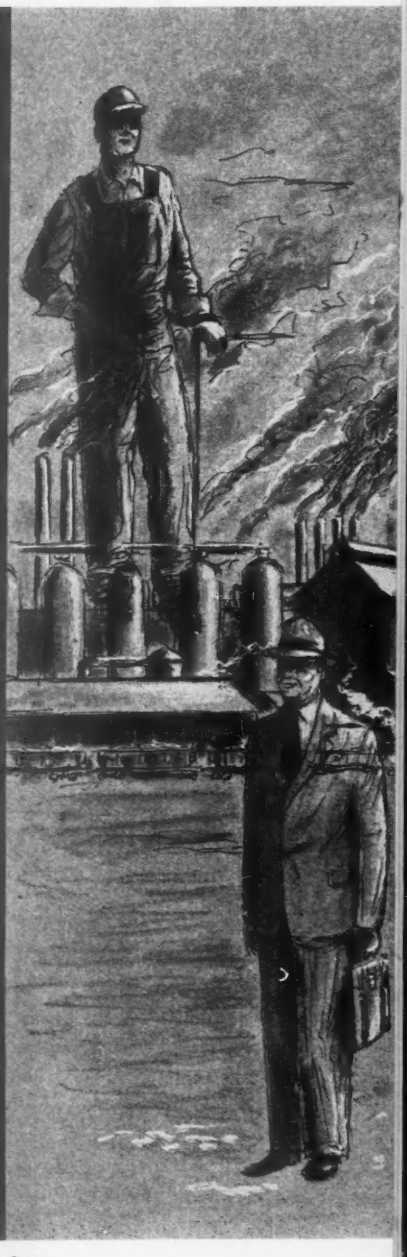
RR
UNIVERSITY OF MICHIGAN
APR 2 1953
ENGINEERING LIBRARY

IN THIS ISSUE . . .

● **WE CANNOT SURVIVE WITH LABOR-MANAGEMENT STRIFE**

By Benjamin F. Fairless,

Chairman, U. S. Steel Corporation



Benjamin F. Fairless Says We Must Find A Way To Settle Labor Disputes

. . . *Also*

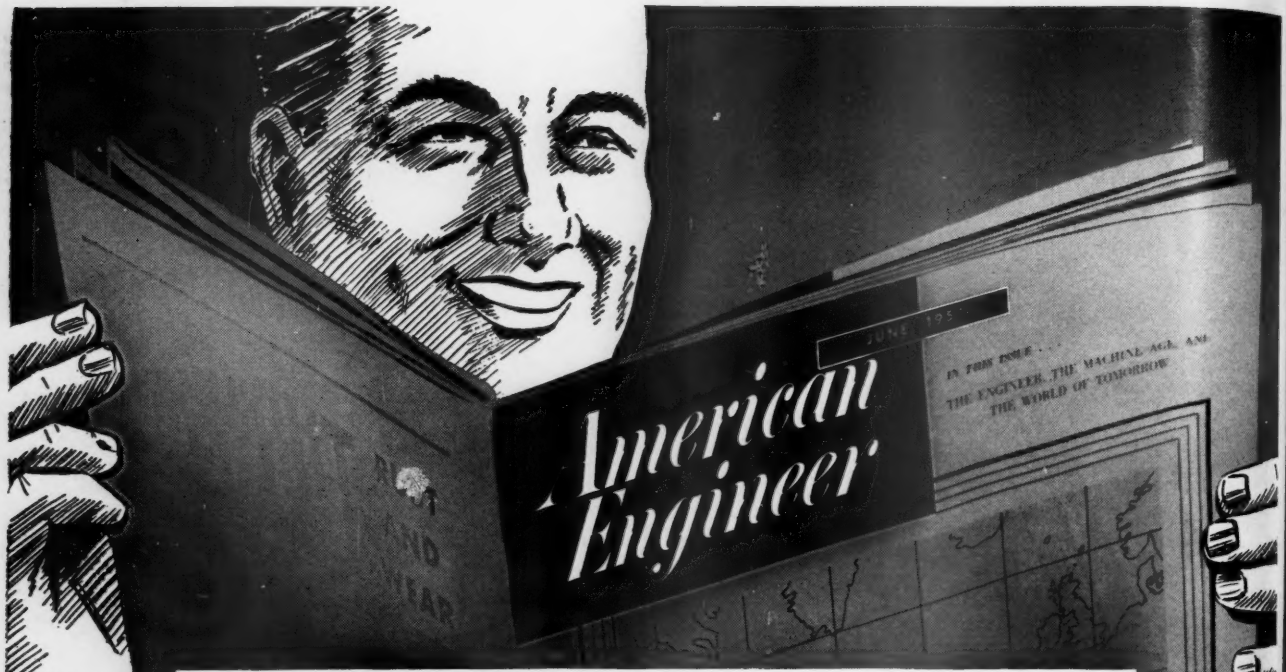
he Romans Knew Their Roads —An American Engineer Photo Story—

●

How to Improve the Utilization of Engineering Manpower —Part II of An Extensive Survey of Industry—

●

Latest Washington Report for Engineers



To convince those who count . . . reach these *important professionals!*

PLACE your message before the group of professional men from whom industry selects its top executive talent . . . professional engineers who direct America's industrial and business life. The American Engineer is published specifically for the men you want to know about you—professional leaders who make up the Membership of the National Society of Professional Engineers. Your message will receive full attention in the pages of their own journal—The American Engineer.

FOR MORE INFORMATION, PLEASE WRITE:

J-V ASSOCIATES
274 MADISON AVENUE
NEW YORK 16, N. Y.
Telephone ORegon 9-0030

American Engineer

Letters

P.E. Hubbies . . .

Dear Editor:

Please accept my thanks for publishing the article "The Engineer-Homefront Specialist" by Mrs. Frances T. Kirkwood. How true! I thought she was writing about *my* husband. Probably many other wives have had the same experiences.

MRS. LOUIS E. SAUER
Sharon, Pa.

Money the Answer . . .

Dear Editor:

Regarding an article in Product Engineering, January, 1953, issue, page 197—in regards to an article you (NSPE) purportedly published, namely "Stretching the Supply of Engineers" . . .

There seems to be a general trend to ignore the *real* issue why there is a so-called "shortage of engineers" . . . That real reason as you well know, but purposely ignore, is low pay and no pay incentives whatever —though most hourly paid employees get bonuses, and many of them, such as draftsmen, machinists (and others that engineers direct) even get more pay than engineers! No wonder there is a shortage! It will be worse, much worse, unless the above situation is speedily corrected.

DEAN A. BRANDS, P.E.,
Norristown, Pa.

On Prestige . . .

Dear Editor:

In the February, 1953, issue of AMERICAN ENGINEER, Mr. James M. Fiske, P.E., of Orlando, Florida, in his provocative letter, presented his thoughts on the plight of the use of the word "Engineer." The point is well taken, and I concur in essence with Mr. Fiske.

The very meaning of the word "engineer" diverges, yes, digresses from the meaning of "engineering." The term "engineer" is very broad and general, permitting many trades and professions to be encompassed in the title.

In reflecting a moment, we realize that the word is so ingrained in our society that it is virtually impossible to purify, to mean only that which scientific engineers desire it to mean.

What can be done?

1. It might be in order for the National Society to study the problem, and design or coin a word befitting the profession. Such word could be copyrighted or confined in definition and scope by statute.

2. If the word "engineer" is too firmly affixed to the engineering sciences, then the solution encompasses many considerations:

a. Is it apropos to grant (or be permitted to be granted) a degree in engineering on graduation from a formal engineering course? Maybe a degree is not in order? Maybe a diploma, or a certificate should define, for the engineering profession, where inexperienced graduates stand in the profession. Of course this would present the problem of a graduate with a master's degree or a doctor's degree.

b. By statutes, as Mr. Fiske infers, it could be made mandatory for all engineering graduates, in order to practice in the engineering field and in the full realm of engineering (not as a draftsman, or a technical writer, etc.) to become an affiliate Professional Engineer and obtain a Professional Engineer's license within a certain time after obtaining a degree, diploma or certificate. One cannot practice law or medicine unless he complies with the requirements of the profession.

c. It might be within the muniments or codicil of the profession to judicate the use of the word "Engineer" (or the designed or coined word) by a firm of consultants.

If the National Society of Professional Engineers inaugurated such a requirement and enlightened the graduating engineer on the mandatory requirements of the engineering profession, the engineering profession would be enhanced and would gain in prestige. The individual engineer would be required to know his engineering and keep abreast with the engineering profession. In the past the engineer has not been informed of the significance and importance of an engineering license or of becoming a Professional Engineer. Actually, an engineer can practice in the profession without meeting this criteria. Why, even a partially technically trained man can practice, to a limited extent, as an engineer. Such felonious acts against the profession are corrected in our tribunals of justice as the Rogers case of 1934 (From: Tennessee's Fonde Case Is Decided In Favor of Engineer's Position, The AMERICAN ENGINEER, February, 1953) instead of being resolved by the National Society of Professional Engineers.

I am now, thirteen years after graduation from an accredited engineering school, seeking my Professional Engineer's license. I anticipate difficulties in obtaining certification of my engineering experiences for I have lost contact with previous superiors and fellow employees. Had I been informed of the laws of the engineering profession, I would have been alert for this contingency. Furthermore, I would have been more alert to engineering science and the engineering profession.

I am in whole hearted support of the National Society of Professional Engineers' endeavor to raise the prestige and integrity of the engineering profession.

T. I. HOWES,
Philadelphia 14, Pa.

Steinman and Arcs . . .

Dear Editor:

Regarding D. B. Steinman's poem in the February issue, I wonder how many Engineers have written you about his implying that a suspension bridge cable hangs in parabolic arc, instead of a catenary. It is refreshing to see poetic license being used by a world famous Engineer.

I am reminded of a passage in "The Mikado," where the Emperor condemns wrong-doers to play billiards "on a cloth untrue, with elliptical billiard balls." Gilbert and Sullivan, being non-professional, are to be excused, but their verses would have seemed more well rounded to an Engineer if they had said "ellipsoidal."

Mr. Steinman's verses are good poetry for anybody's money He places himself alongside Omar Khayyam, who, during his lifetime, probably enjoyed more fame for straightening out the Persian calendar than he did for writing the Rubiyat.

J. G. MOORE, P.E.,
Daytona Beach, Fla.

(Continued on page 5)

FREE 236-PAGE
ALLIED 1953
ELECTRONIC SUPPLY CATALOG

ONE COMPLETE DEPENDABLE SOURCE FOR EVERYTHING IN ELECTRONICS

We specialize in Electronic Equipment for Research, Development, Maintenance and Production Operation

World's Largest Stocks of Electronic Supplies for Industrial and Laboratory Use

Simplify and speed your purchasing of electronic supplies and equipment—send *all* your orders to ALLIED —the reliable one-supply-source for *all* your electronic needs. Depend on ALLIED for the world's largest stocks of special-purpose electron tubes, test instruments, audio equipment, electronic parts (transformers, capacitors, controls, etc.) and accessories—complete lines of quality apparatus. Our expert Industrial supply service saves you time, effort and money. Send today for your FREE copy of the 1953 ALLIED Catalog—the *complete, up-to-date* guide to the world's largest stocks of Electronic Supplies for Industrial and Broadcast use.

SEND FOR FREE 1953 CATALOG

ALLIED RADIO CORP.

833 W. Jackson Blvd.,
Dept. 70-C-3
Chicago 7, Illinois

American Engineer

MARCH, 1953

Kenneth E. Trombley,
Editor

Mary Margaret Milbrath,
Assistant to the Editor

•

A. C. Neff, P.E.,
Chairman, Publications
Committee, NSPE

•

N.S.P.E. Officers

John D. Coleman, P.E.,
President
Dayton, Ohio

Clarence T. Shoch, P.E.,
Vice President
Allentown, Pa.

Dean W. Dougherty, P.E.,
Vice President
Knoxville, Tenn.

E. W. Seegar, P.E.,
Vice President
Milwaukee, Wisc.

C. Y. Thomas, P.E.,
Vice President
Kansas City, Mo.

T. Carr Forrest, Jr., P.E.,
Vice President
Dallas, Tex.

William D. Williams, P.E.,
Vice President
Phoenix, Ariz.

Russell B. Allen, P.E.,
Treasurer
College Park, Md.

Paul H. Robbins, P.E.,
Executive Director

•

I believe that this nation has a right to expect American labor and management to bargain in a spirit of reason and decency. I believe it is fed up to the gills with name-calling, mud-slinging and personal abuse . . . I believe it expects both of us to live and let live . . .

—BENJAMIN F. FAIRLESS, *Chairman, U. S. Steel Corporation.*

•

CCA

Member, Controlled Circulation Audit

• SPECIAL ARTICLES

We Cannot Survive With Labor-Management Strife 11

By Benjamin F. Fairless, Chairman, U. S. Steel Corporation. This outstanding industrialist warns that "something is haywire with the rules of the game" and progressive action must not be long delayed.

The Romans Knew Their Roads 15

An American Engineer Photo Story. Here's some interesting history about an industry that spends $4 billion annually in America.

How to Improve the Utilization of Engineering Manpower 19

The results of a year-long Executive Research Survey conducted by NSPE's Professional Engineers Conference Board for Industry. Part II of II parts.

Frank N. Piasecki Wins Jaycee Award 18
Industry-Education Teamwork 25
The South Brings Its Building Codes Up-to-Date 26

• REGULAR FEATURES

Letters 3
Professional News Briefs 6
NSPE Believes—Why A Professional Society? .. 8
From Washington—Late Report 9
Professional Postscripts 27
With Our Members 30
What's New—New Products of Interest 41
Professional Directory 42

ADVERTISING INFORMATION:

Eastern Representatives:
J-V Associates,
274 Madison Avenue,
New York 16, N. Y.
Telephone: ORegon 9-0030

National Headquarters:
R. A. Oliver, Advertising Director,
American Engineer, 1121 15th St., N. W.
Washington 5, D. C.
Telephone: ADams 4-1622

The American Engineer is publishd monthly by the National Society of Professional Engineers, 1121 15th St., N. W., Washington 5, D. C. Entered as Second Class Matter at the Post Office, Washington, D. C., under act of March 3, 1879. Copyright, 1953, by the National Society of Professional Engineers. Not responsible for opinions expressed in signed articles. Subscription Rates: $2 per year in advance to members of NSPE and its Affiliated Societies; $3 per year in advance to non-members in U. S. A. and its possessions, Canada, and Mexico. Foreign, $4 per year. Single copy, 35c.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
FOUNDED 1934

Letters

(Continued from page 3)

Public Power . . .

Dear Editor:

On page 3 under "Letters" in the February issue is one on public power, by Robert S. Dole, P.E., Lewiston, Idaho, in which he criticizes your paper and P. L. Smith for his article in the December issue. Mr. Dole says that public power vs. private power is a political question and has no place in the pages of a technical publication. Then Mr. Dole attacks the NSPE resolution saying it is against public ownership of power generating and transmission facilities. I write this in your defense as well as to call to Mr. Dole's attention the following facts.

The AMERICAN ENGINEER should print Mr. P. L. Smith's article or any others similar, for each side of every question should be stated. I say it is your duty to do so.

I suppose Mr. Dole is a member of our Society and as such he should know our Canons of Ethics and our aims as a Society, which I quote from as follows: (Speaking of the engineers)

> **"It is his duty to interest himself in public welfare."**
>
> **Objectives: "The advancement of the public welfare."**
> **"The development of the civic consciousness of the members of the engineering profession."**

and finally: The statement by L. E. Peterson, Chairman of the International Relations Committee of the NSPE in his talk (a couple of years ago or so) in Mexico City. He said: "Our fundamental legislative policy must be that the public good comes ahead of the good of the engineering profession alone."

To correct Mr. Dole let me say that our Resolution No. 14-A-52 says nothing about generation or transmission. It reads as follows:

> **"Now, therefore, be it resolved that the National Society of Professional Engineers, favor the use of private enterprise in the development of our natural resources, guided by sound principles of conservation and point to the Niagara River Development and the Hell's Canyon Project on the Snake River as instances where legislation is being considered that violates this principle."**

The facts in these cases sustains the resolution;—

In the Niagara case over $350,000,000 would be needed for the power plant as proposed and estimated by the U. S. Government, whereas five local electric companies offer to build the same job on the same plans without spending one cent of the taxpayers' money.

In the Hell's Canyon project: The one large dam by the U. S. Government is for 720 feet head to install 688,000 k.w. and to cost $360,000,000 or at a cost of $522.50 per k.w. installed. As against this the Idaho Power Co. will build 3 dams in place of the one large one and install a total of 783,000 k.w. for a grand total cost of $130,-050,000, or at a cost of only $166.00 per k.w. installed.

I fear that a great many of the public power boys do not realize that when the Federal Government undertakes an electric project, that power companies can do, the public pays twice: first, for the cost of the project in taxes and secondly, for the local, state and federal taxes that are lost.

The public power boys have brought this criticism on their own heads with wasteful spending and to quote sentences from the public press: "with lack of sincere co-operation among Government agencies in these river developments." And: "the flagrant disregard of the law that requires plans to be kept up to date." And: "the deceptive cost estimates to Congress and allowing expenditures to exceed authorization."

The American people have spoken. The old regime has been voted out of office and we have a new one. Such could be expected. The public power boys must sit up and take notice that the American public are now expecting *economy* first, last and always.

H. H. WHITE, P.E.,
Atlanta, Ga.

A. E. Fans . . .

Dear Editor:

The AMERICAN ENGINEER would hardly be considered as a ladies' magazine. Yet, my wife generally reads and marks it for my attention. This has been going on for so long that I do not recall the reason for her interest.

After reading the issue for January 1953, she suggested certain reading "first."

1. The article by Mrs. Kirkwood on pages 20 and 21.
2. The reprint of an editorial in Professional Postscripts, page 24.
3. The letter to the editor by Pacifico Montano, P.E., pages 3 and 7.

Following these, it was expected that I would continue reading it all.

The reading, as suggested, brought to mind the status of the Professional Engineer in his community life and the question of the shortage of engineers.

Discussing the status of the Professional Engineer, does anyone wonder why he does not come under the tongue of good repute? A neighbor might inquire "How is the strike going?" or "When will the strike be settled?" A wondering expression, and a few questions, elicit the information that the neighbor is referring to the strike of a group known as "Hoisting Engineers," "Stationary Engineers," "Marine Engineers" or some other labor organization. Our neighbor has heard that we were an "Engineer" and assumed that we must be in one of those categories, since the strike actually did affect operations at the plant where we were employed. The neighbor had probably contacted more men of affluence among the labor union's "- - - Engineers" than was evident in my case. This is just another reason why we as Professional Engineers, collectively and individually, must take a more active part in civic and community affairs. By so doing, the opportunity will present itself, and we must take advantage of every opportunity, to publicize the works of the "Professional Engineer." We must then identify ourselves as Professional Engineers.

The shortage of engineers is a matter of perspective:

1. There is a shortage of engineers—

(Continued on page 29)

sell the TOP man . . .
the REGISTERED engineer
HE SIGNS THE ORDERS!
DO IT NOW THROUGH American Engineer
The Official Magazine of the REGISTERED PROFESSIONAL ENGINEER

Wanted—

● ENGINEERS AND DRAFTSMEN

by well-established Middle Western engineering firm, including 3 structural engineers, 2 architectural designers, 3 designers of sewage treatment plants, 1 mechanical man for plumbing and heating, 2 designers of water purification and softening plants, 3 highway bridge designers, and 12 draftsmen to do detailing on reinforced concrete, plumbing, heating and industrial piping. Excellent working conditions, including non-contributory pension plan, group life insurance, Blue Cross insurance and liberal bonuses under a profit-sharing plan. Excellent opportunities for substantial progress for well-qualified men.

CONSOER, TOWNSEND AND ASSOCIATES
351 E. Ohio St., Chicago 11, Ill.

AEROFIN
CORPORATION
Syracuse New York

KENNEDY-RIEGGER DRILLING CO., Inc.
Diamond Drill & Core Borings
TEST BORINGS
5418 Post Road New York City
Telephone KI 9-8458

Professional News in Capsule Form

Coleman Promises NSPE's Cooperation to President and Congress • Industrial Waste Conference Planned at Purdue • National Science Foundation News • NSPE Members Honored by Other Societies • Other Items of Interest

President Eisenhower, Vice-President Nixon, each member of the new Eighty-third Congress, and new Department Secretaries who will be interested in engineers' problems have recently received letters from NSPE President John D. Coleman, extending the Society's good wishes and offering to provide any information regarding the engineering profession that the legislators may need in the course of their work.

"At all times," Mr. Coleman wrote, "such presentations as are made to you by this organization will be in the spirit of helpfulness and the desire to recommend that which we sincerely feel is best for the nation. It is a firm policy of the National Society of Professional Engineers that no legislation can be good for the engineering profession if it is not at the same time in the best interests of our country."

* * *

The Eighth Purdue Industrial Waste Conference is scheduled for May 4, 5, and 6 in Lafayette, Indiana. The Conference will be held in the Purdue Memorial Union Building, and registration is open to anyone interested in the disposal of industrial waste.

* * *

New grants for engineering research studies have just been announced by the National Science Foundation. The schools selected to receive them include the Universities of California, Minnesota, Tennessee, and Wyoming, Clarkson College of Technology, Lehigh University, Louisiana State College, Massachusetts Institute of Technology, Pennsylvania State College, and Rensselaer Polytechnic Institute.

* * *

Another announcement from the National Science Foundation states that Dr. Paul E. Klopsteg, the assistant director for mathematical, physical and engineering sciences, has been appointed to the new position of associated director of the Foundation. Dr. Raymond J. Seeger, program director for physical sciences, has been named acting director for mathematical, physical and engineering sciences.

* * *

Reg F. Taylor, a consulting engineer of Houston, Texas, and an NSPE member, has been elected 1953 president of The American Society of Heating and Ventilating Engineers.

* * *

NSPE member Elgin B. Robertson, president of Elgin B. Robertson, Inc., Dallas, Texas, has recently been nominated for the presidency of the American Institute of Electrical Engineers. He is currently serving on the Institute's Board of Directors.

Walter B. Morton of Allentown, Pa., also an NSPE member, is a nominee for vice president of the Institute; and T. M. Linville of Schenectady, New York, and E. W. Seeger of Milwaukee, Wisconsin, have been nominated as directors. Balloting results are to be announced at the AIEE summer meeting in June at Atlantic City.

* * *

From Assistant Dean Walter Emmons of the University of Michigan College of Engineering comes the announcement that there are 548 first-year students enrolled in the college as compared with only 355 last year. Second-year students for the 1952-53 term now number 457, third-year students 329, and fourth-year students 408.

* * *

The creation of a Department of Science with a secretary of cabinet rank was proposed recently by the American Chemical Society. It was suggested that the National Science Foundation might form the basis of such a department. The proposal was made in the Society's weekly magazine, "Chemical and Engineering News."

* * *

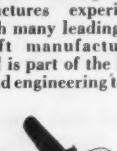
A Ph.D. in engineering or science will add about $40,000 to the lifetime salary of a bachelor of science, according to Dr. B. R. Stanerson, secretary of the American Chemical Society's committee on manpower. Speaking recently in Philadelphia, Dr. Stanerson stated that, upon starting to work after receiving the doctoral degree, the engineer or scientist could expect to earn about $125 more per month than he would be earning at that point if he had accepted a job immediately after graduating with his B.S. degree. This differential will remain more or less constant over a period of years, he pointed out.

An encouraging report from the Office of Education indicates that college salaries are gradually rising. The report showed that in fifty-one land grant colleges the salaries had increased from the 1949-50 school year

Engineers

AN INVITATION TO YOU TO GO PLACES WITH FAIRCHILD

Roy W. Lessard, Assistant Chief of Design. Has had extensive aeronautical design and structures experience with many leading aircraft manufacturers and is part of the Fairchild engineering team.



A secure future, exceptional opportunities for advancement, and a high starting salary await you at FAIRCHILD. We have openings right now for qualified engineers and designers in all phases of aircraft manufacturing.

Paid vacations, liberal health and life insurance coverage, 5-day, 40-hour week as a base. Premium is paid when longer work week is scheduled.

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD Aircraft Division
HAGERSTOWN, MARYLAND

to the next at a rate varying from 9.1 per cent for professors to 12.7 per cent for instructors.

The median twelve-month salary for deans in 1951-52 was $8,697; for professors, $7,166; for associate professors, $5,888; for assistant professors, $5,066; and for instructors, $4,178. Full-time faculty members numbered 26,243.

For twenty state universities studied, the median for deans was $8,913. The figures for both the land grant colleges and the state universities showed that the median salary for college presidents rose from $8,700 a year in 1921-22 to $16,375 thirty years later.

* * *

Engineers engaged in military electronics work were urged to keep in mind the fact that soldiers, sailors, and airmen have to keep military equipment running under adverse conditions so that it should be designed as simply as possible. The warning came from Dr. J. M. Bridges of the Navy Bureau of Ordnance, speaking before a recent meeting of the American Institute of Electrical Engineers at the Statler in New York. It would be a good idea, Dr. Bridges suggested, to have a sign reading, "It has to work in battle," posted everywhere complex modern military equipment is being designed.

NSPE To Conduct Income Survey Among Members To Gather Economic Data

A salary and income survey to obtain current information on the economic status of professional engineers has been announced by Mr. Ole Singstad, chairman of NSPE's Committee on Salaries and Fees. A simple questionnaire is being sent to each member of NSPE requesting information covering 1952. The data to be obtained covers income, year of entrance into the engineering profession, branch of work, type of work and field of employment. The survey will also analyze the grades in which the members' positions fall, according to the Committee's schedule of eight grades of responsibility and duties.

It is urged by Chairman Singstad that each member make a special point of cooperating in this important project by carefully completing the questionnaire and returning it to the Washington Office without delay. A cut-off date of March 31 has been established to turn the questionnaires over to the company which will do the basic tabulating. Following the tabulation and analysis of results, a report will be published by the Committee containing the basic information disclosed by the survey.

The Bureau of Labor Statistics has just released its findings of a survey of the members of the major engineering societies covering 1949-50 economic data. The information disclosed in this survey will be the subject of a special report in next month's issue of the AMERICAN ENGINEER. The only other economic data on engineers' income of recent origin is for 1946. It is pointed out that neither of these reports reflect current income and salary facts and, therefore, the current NSPE survey will be a valuable contribution to the profession.

The survey is completely anonymous and the information submitted by the members will not be susceptible of individual identification.

NYSSPE Hits Law Allowing Corporations To Practice Engineering

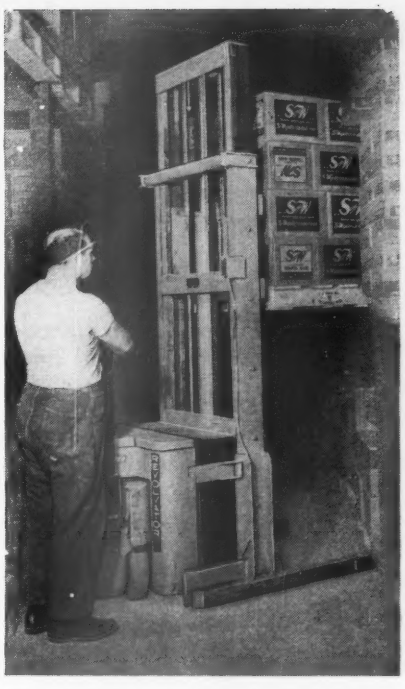
The New York State Society of Professional Engineers has called upon its members to oppose legislation pending in the New York legislature which would permit the practice of professional engineering by corporations. Under the present New York law corporate practice is forbidden except for those corporations lawfully practicing in the state prior to April 15, 1935, and continuously thereafter.

The announcement of the New York State Society states that the pending amendments would reduce restrictions on corporate practice to a minimum and would lead to a situation whereby any corporation could readily enter the engineering field. It is stated that the change would have the following effects:

1. Permit a corporation of any size to practice engineering with only one officer, however subordinate, licensed as a Professional Engineer.
2. It could lead to engineering "factories" thus reducing individual opportunity and incentive.
3. It would strike at the very roots of our Engineering Profession, which has always placed in the hands of the individual Licensed Professional Engineer the primary responsibility for protecting the Life, Health and Property of the Public.

Dr. David B. Steinman, former

(*Continued on page* 38)



FINGERTIP CONTROL

Revolvator Go-Getter — telescopic straddle type lift truck — a bear for work in crowded areas, narrow aisles. Fully automatic — extraordinarily maneuverable 200° turning arc — 2500 lb. capacity — very slight operator training necessary. Write for full details of this and many other models.

REVOLVATOR CO.

8782 TONNELE AVENUE • NORTH BERGEN, N. J.

Welding Connectors

Saxe Welding Connection Units position and secure structural parts to be welded.

Clip K3A permits an adjustable connection.

These widely used units eliminate all hole punching, and, with welding, produce the most economical, safe, and quickly erected structural frame.

Write for 1951 edition, Structural Welding Practice Manual.

J. H. WILLIAMS & CO.
Buffalo 7, New York

AIR REDUCTION CANADA, LTD.
Montreal 2, Canada

Don't Miss the American Engineer Next Month!

On the Serious Side . . .

Graduate Education and Our Profession, By Dr. R. L. Sweigert, Dean, Graduate Division, Georgia Tech

On the Lighter Side . . .

An Engineering Fish Story!

N.S.P.E. Believes

WHY A PROFESSIONAL SOCIETY?

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

1952 saw the celebration of the Centennial of organized engineering activity in the United States. During the Centennial, some 35 national engineering societies held meetings in Chicago. There were at least a score more which, because of conflict in dates or for other reasons, were unable to hold meetings at that time. Each of these organizations was formed for the purpose of advancing the technology and information, as well as providing a community of discussion, of a particular branch or interest in the engineering profession.

As early as World War I there began to appear common interests of all engineers. These interests were of a non-technical nature and obviously were common problems of all engineers rather than the interest of any single group. In an attempt to do something about these problems, several organizational patterns evolved, some of which are still in existence and others of which have been disbanded.

Based on these experiences, a philosophy of organization developed that every engineer has two distinct interests. First, he is a member of the engineering profession, and as such has a common interest with every other member of the profession in professional, social, economic, and ethical fields. Secondly, he has been trained in and his work usually involves one particular branch of the profession, establishing a community of interest and a need for organization in that particular area.

Based on this philosophy, there clearly emerged two basic tenets: (1) there is a very definite need for technical branch organizations, and these should be supported and sponsored by every engineer in that particular branch; and (2) there should be an organization devoted to the professional interests of all engineers, and all engineers should likewise support and promote its activities. Every engineer needs both organizations, just as he needs two arms or two legs to operate at his highest potential.

But this philosophy still left unanswered the organizational pattern which would be most effective. There were certain other elements of organization which were needed to bolster this basic concept.

First, the professional items of the engineering profession would be only as effective as their support both by the activity and the finances of the individual members of the profession. On this basis, then, it was determined that the organization should be an individual dues-paying membership type of organization.

Secondly, realizing that there is a community of professional interest among engineers at the municipal level, the state level, and the national level, it was determined that the organization should be a three-level one. The ideas and policies should stem from the individual engineers, and be coordinated and implemented by a democratic representation at the higher levels of organization. This three-level type of organization had the additional advantage of parallelling governmental structure and, hence, could be most effective in this very vital professional activity.

Thirdly, since this organization was to concern itself with professional matters affecting engineers, it was determined that only engineers should govern its policies. In searching for a definition which would be satisfactory in distinguishing those who were engineers, it was recognized that registration laws had been most effective in other professions and were rapidly being accepted in the engineering profession. Since these laws established a Board of competent engineers in each state to evaluate the qualifications of those desiring to practice engineering, it was felt unnecessary for the professional organization to establish other criteria and additional review for this purpose. Registration thus was accepted as the qualification for membership in the professional Society.

Fourth, since there were so many common problems and since they would require extensive activity and effort to resolve, and since there were in existence societies dealing adequately with the development of the technical phases of engineering, it was resolved that the organization would devote its entire efforts to the professional, social, economic, and ethical problems of the profession.

These, then, are the basic cornerstones on which the professional society has been built. Starting in 1934 with only four state societies, less than 3,000 members, it has grown to where it now has a membership in excess of 28,000, affiliated state societies in 39 states, and well over 300 chapters.

The effectiveness of an organization based on these principles is self-evident. The programs and development of the National Society of Professional Engineers are indicative of the great good which can be accomplished through this mechanism. Support means not only membership, but *active* membership, willing to work on committees, accept offices, and study the profession's problems in order that we may mobilize the brain power of the nation's largest profession.—*End.*

FROM WASHINGTON

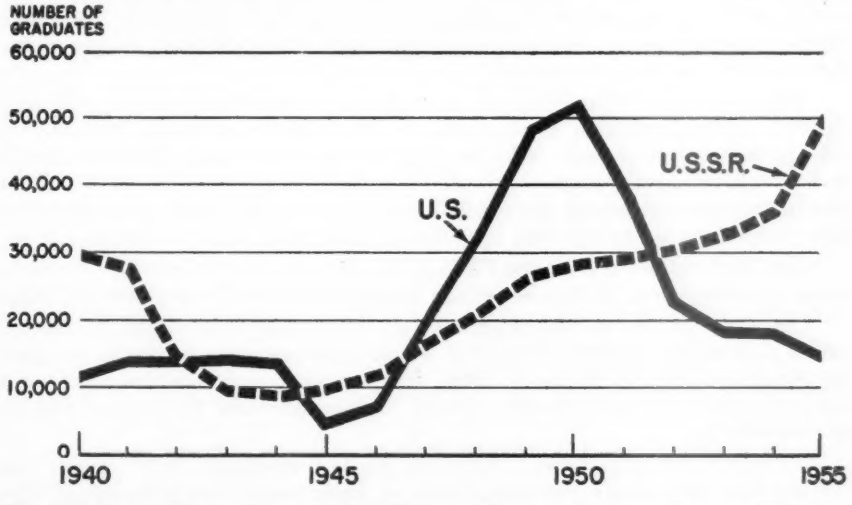
By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

This is the time of year when Washington is inundated with official reports, ranging from foot-and-mouth disease to the number of accident claims against the government. The usual and traditional disposition of these reports, covering the agency activities of the previous year, is that they are duly noted and filed away to be forgotten and gather dust.

Some of the information and comment in these reports is entitled to more than casual notice by the engineering profession. This is particularly true of the report of the National Science Foundation. The NSF is gravely concerned about the engineering manpower picture for the present and the future. "On the basis of present and foreseeable college enrollments it seems unlikely that the desired level of 30,000 engineering graduates a year can be reached before 1965," the report states. This is probably the most severe prediction of any official or semi-official agency concerned with the manpower supply problem. Contrasted with it, for example, is the estimate of the Office of Defense Mobilization, reported in last month's issue of the American Engineer, that the nation will have 30,000 engineering graduates by 1956. Heretofore, the experts in the manpower field have talked of supply catching up to demand in 1954, 1955 or 1956, but no one has suggested the figure reported by the NSF. A check with NSF officials to confirm this estimate indicated that the long-range forecast is based on the opinion that while college enrollments might produce 30,000 engineering graduates by 1956 it is felt that this rate will not be maintained in the light of present and anticipated enrollments. According to the report, the number of graduates in engineering will reach a low of about 15,000 in 1955.

A glance at the chart on this page, reproduced from the NSF report, shows one of the major reasons for the concern of the governmental science organization. The report states that it is interesting to note that the Soviet Union plans for a constantly increasing number of engineering graduates. "Goals for 1955 call for nearly 50,000 engineering graduates, which represents a steady rise from a low point of 9,000 graduates in 1943."

The concern of the Science Foundation is echoed in another significant report—that of the National Security Resources Board. This agency states that the United States needs more scientists and engineers and a greater number of technicians to support the work of the scientists and engineers. NSRB makes a strong plea for the training of more supporting technicians, declaring: "The shortage of technicians is now felt in every field of engineering, physics . . . and other professions, and becomes more acute as we develop increasingly complex weapons. This problem is serious both for wartime industrial operations and in terms of the needs of the armed forces for men skilled in the operation of advanced armaments. The need is keenly aggravated by the growing importance and impact of nuclear energy science."



ENGINEERING GRADUATES IN THE UNITED STATES AND THE SOVIET UNION, 1940–55

Efficient use of the Nation's manpower is one of the cardinal requirements of an effective mobilization program, according to NSRB. The agency points with pride toward its part in establishing the student deferment program under Selective Service which, it is said, has aided in keeping the pipeline of scientific personnel filled and prevented a serious gap in the production of scientists and engineers which might have occurred during the last two years.

It is interesting and important to note that while the government agencies and others are fav-

(Continued on page 10)

(Continued from page 9)

orable to the student deferment program, especially for engineering and science, there is a growing discontent and rumbling in some quarters against a policy which it is said produces serious discrimination between those who shoulder the guns and those who carry college tomes and texts. Typical of this feeling was a statement on the floor of the House of Representatives recently by Representative Thomas G. Abernethy, (D., Miss.) who said: "That provision of the Selective Service Act permitting large-scale deferment of college students ought to be repealed. In fact, it never should have been passed . . . It has produced a bad effect and growing resentment among thousands of families whose sons have been forced into service because of their inability to attend college. This sort of special privilege has no place in the American system." The Mississippian inserted an editorial in the Record from the Jackson (Miss.) Daily News along the line of his remarks except the editorial did acknowledge, "In a much-needed Congressional revision of that system the present shortage of trained technicians and scientists must, of course, be considered." The new Assistant Secretary of Defense (Manpower and Personnel), John A. Hannah, formerly president of Michigan State College, has acknowledged his concern with the dissatisfaction in connection with the student deferment program and told the Senate Armed Services Committee that he felt the current policy should be reviewed. Likewise, Major General Lewis B. Hershey, director of the Selective Service System, has recently stated that the manpower pool of those available for military service is running low and we must consider expanding the pool by some changes in present policies. One of the changes which General Hershey feels may be necessary involves a tightening of the standards for student deferment and thus reducing the pool of almost-200,000 who are not liable for military service at the present time by reason of their student status.

Thus, while the experts and the government agencies are striving to expand college training for more engineers, a counter move may develop against the very policy which keeps many of the students in school—a good part of whom are engineering students.

Before leaving the NSF report, it is worthwhile to note the concern expressed in another phase of the nation's scientific progress. That is the all-important question of basic research. The function and importance of basic research is easily understood by scientists and engineers, but not so easily appreciated by a practical-minded Congress. The development of better tanks, guns, atomic bombs and other specifics is something every member of Congress understands and supports. But when it comes to money for research into the unknown with no specific goal—merely the quest for more basic knowledge in certain fields—Congress is not so apt to put up the necessary funds. The NSF puts it this way:

"The vast bulk, then, of the total national expenditure for research and development, and as a corollary, the major part of available research facilities and specialized manpower are committed to the furtherance of specific program goals.

"Therein lies a serious threat to the security and future well-being of the United States, for the great forward advances in science have seldom come primarily from applied or programmatic research. In the opinion of the Foundation and its advisory groups the cornerstone of national science policy is to assure adequate support—not only in terms of funds but in terms of qualified scientists and research facilities—for basic research in the sciences."

Basic research is described as our defense in depth or in the words of Vannevar Bush, "basic research is the pacemaker of technology." The NSF report makes the point that the nation's present agricultural, economic, industrial and military position has been achieved because of its ability to turn scientific knowledge to practical account. Many students of the problem have pointed out that in the past the nation has relied upon and benefited from the basic research of foreign scientists—something we cannot rely upon to the same extent in the future.

The NSF report quotes the famous French historian, Alexis de Tocqueville, one of the most noted commentators of the American scene, who stated more than one hundred years ago:

"In America the purely practical part of science is admirably understood; and careful attention is paid to the theoretical portion which is immediately requisite to application. On this head the Americans always display a clear, free, original, and inventive power of mind. But scarcely anyone in the United States devotes himself to the essentially theoretical and abstract portion of human knowledge."

To which the NSF states: "Although the last statement is no longer true, as a nation we do not yet fully appreciate the importance of basic research to technology." Chester I. Barnard, Chairman of the National Science Board states in the foreword of the report that we have reached the point which justifies the expenditures to a degree not possible earlier of manpower, resources, and money solely to extend our knowledge and develop fundamental scientific ideas for their potential, if not immediately apparent, practical significance. But he then points out that the present restriction in the National Science Foundation Act holding appropriations to a maximum of $15,000,000 in any year seriously limits the capacity of the Foundation to carry out effectively its statutory directives. It is worth noting that even the $15,000,000 of authorized funds has not always been forthcoming from Congress since the beginning of the Foundation a few years ago. And it is equally apparent that much more urging and education will be necessary for the Foundation to fully implement its original purpose of supplying the support and aid of the government in filling the gap in American scientific progress—the gap of basic research.

Homestead (Pa.) District Works officials meet frequently with union grievance committeemen to iron out differences that develop during the course of the day's work. Here Robert Thomas, with paper in hand, division superintendent of open hearths at this U. S. Steel plant, sits in on a grievance session. Left to right are Michael Getsy, assistant grievance committeeman; R. A. Wollett, assistant to division superintendent — open hearths; John J. Katrinsak, chairman grievance committee; E. J. Dattisman, assistant division superintendent — open hearths; Thomas; and Andrew A. Kane, grievance Committeeman.

We Cannot Survive With Labor-Management Strife

BY BENJAMIN F. FAIRLESS,

Chairman, U. S. Steel Corporation

LAST July 26 Philip Murray and I stood before some 200 members of the CIO's Wage Policy Committee who had assembled at the Mayflower Hotel in Washington to cheer the good news that a labor contract had been signed between the major steel companies and the union. It was a noteworthy occasion: a costly strike had been terminated and both union and management felt an equitable settlement had been reached. Concord was the order of the hour.

But . . .

What happened in the days preceding the reconciliation? There had been eight weeks of strike. In the midst of an emergency armament program the nation lost nearly 18 million tons of steel. Union members had sacrificed an average of $650 per man in wages. Other industries felt the impact. Coal mines were shut down and thousands of railroad workers were furloughed. Steel-consuming manufacturers ordered production curtailed as inventories dwindled.

Everyone lost—everyone, that is, but Joe Stalin. It is my conviction the strike need never have occurred. Ironically, the contract signed that day in Washington substantially contained terms offered by the steel companies prior to the strike. The only conclusion to such a damaging impasse between labor and management is that something is haywire with the rules of the game.

Last fall at the celebration of the Centennial of Engineering I pointed out the alarming extent to which our advances in the scientific and engineering fields are now being wiped out by our failure to make similar progress, as a nation, in the field of human relations. Here is one startling example among hundreds which emphasizes this point:

Since the end of World War II the American steel industry has been engaged in a vast program of expansion which has added an average of about 2½ million tons each year to its ingot capacity. But in the same period the industry has lost an average of 7 million tons annually as a result of strikes. That means for every ton of capacity we have added, we have lost nearly three tons of production.

Production losses resulting from strikes impose a severe penalty upon our industrial might. At Morrisville, Pennsylvania, for instance, U. S. Steel is spending more than $400 million on the largest single integrated mill ever undertaken by the industry at one time. It will take this plant ten years to turn out as much tonnage as our nation lost in less than eight weeks last summer.

Obviously the time has come for us to search for a better way to settle our labor disputes. The American people are patient, but they will not sit by forever and permit strikes to endanger our national defense, to impede our industrial

Blast Furnace iron is shown being charged into an open hearth furnace at U. S. Steel's South Works, Chicago, Illinois, for the production of high grade steels.

progress and to wipe out the savings of thousands of workers, many of whom—in some cases—are not directly involved in the controversy. Ultimately the force of public opinion is going to compel drastic action in Washington—action which can only result in the further suppression of our precious liberties.

ALREADY we hear it suggested that the right to strike be abolished completely in periods of national emergency. That way, I think, lies slavery, and I do not see how any thoughtful American can support such a proposal.

Elsewhere we hear an increasing demand for government arbitration of labor disputes. That way, I believe, lies the eventual nationalization of industry and the murder of Free Enterprise, for it seems clear to me that if wages and other major production costs are to be dictated by any government-appointed agency, then the government itself must soon take over our industries and assume direct financial responsibility for the consequences of its decisions. Should that occur, of course, it would also mean the end of labor's right to strike; for the right to strike against the government is already denied by law.

So either of these proposals must lead to the suppression of individual freedom and both are, therefore, fundamentally wrong. I do not mean to suggest, however, that there is no need for government action in this field. There is.

I believe that government must fix the rules under which the collective bargaining process is to operate—rules that are fair to both sides and that are enforced, firmly, and without favor. I also believe that some future Congress must face up to the question of labor monopoly just as past Congresses have clamped down on industrial monopoly.

But I do not believe that political interference with the collective bargaining process itself can ever produce anything but more industrial conflict. Government intervention does not prevent strikes—it invites them. And it always will as long as one party or the other has a better chance to get a favorable settlement from its political friends in Washington than it has at the bargaining table.

During the past year Benjamin F. Fairless, Chairman of U. S. Steel Corporation, has made notable contributions in exploring a better way for creating harmony between labor and management. Those who attended the celebration of the Centennial of Engineering in Chicago last September will recall that Mr. Fairless was given the John Fritz award for his work in this field. In this issue of the American Engineer Mr. Fairless summarizes his thoughts on this important problem which faces America today.

We learned this under the Labor Board in the last war. We learned it again under the administration of wage and price controls; and if we didn't learn it during the recent steel strike we are incapable of learning anything!

But we cannot look to government for the final answer to this problem. We must solve it for ourselves. It is a responsibility that rests upon all of us—and especially on management and labor. There must be a better way of settling our differences than just by slugging them out at the expense of the entire nation. There must be a better way of using our freedom than by undermining our ability to defend that freedom. And clearly there is. Our job is to find it.

I believe that this nation has a right to expect American labor and management to bargain in a spirit of reason and decency. I believe it is fed up to the gills with name-calling, mud-slinging and personal abuse. I believe it expects labor to use the strike only as a weapon of last resort—not as the opening gun in a campaign for tactical advantage. I believe it expects management to respect and defend the right of its workers to bargain, voluntarily, through unions of their choosing. I believe it expects both of us to live and to let live—to recognize that our long-range interests are identical . . . not antagonistic . . . and that anything which injures one of us will gravely jeopardize the securtiy of the other.

In short it expects us to substitute cooperation for conflict; and to end this industrial warfare once and for all.

THAT is a large order. It is a task to challenge the finest minds in the land. It will demand infinite patience and endless perseverance. But if it can be accomplished, it will stand out—I think—as the greatest contribution of this century towards the industrial development of America.

Our failure to find a better way to solve labor-management difficulties stands as a perilous threat to our system of free enterprise. Throughout history are repeated examples of how government dictatorship of business has spelled doom to both labor and management, as well as the entire economy of the involved nations. Government control, instead of guidance, eliminates initiative—the vital ingredient of any nation's growth. It plays no favorites, for both labor and capital are swept aside when government takes the helm.

In colonial America, the tools that a worker employed were simple and cheap, and he owned them himself as a rule, but today they have become so complex and so expensive that in many of our major industries it takes tens upon tens of thousands of dollars to provide the machines and materials that a single worker uses. Since no individual has that kind of money—even in America—it re-

quires the combined savings of millions of our people, in all walks of life, to suppy the productive facilities upon which our industrial workers depend.

Thus, over the centuries our whole national economy has become deeply rooted in what is known as the "capitalistic system"—not the monopolistic variety of capitalism which has existed so widely in Europe, but a peculiarly American brand of highly-competitive capitalism which we like to call free enterprise.

About a hundred years ago, however—when our American Enterprise system was just beginning to provide our people with all the luxuries which have now become so commonplace in their daily lives—two very brilliant and highly educated men named Marx and Engels published in Europe, a document which has inflamed the minds of greedy men in every corner of the earth. They called this document a "Communist Manifesto," and it has become the unholy Bible of the Socialist's religion.

Briefly, Marx argued that workers would never be free until they, themselves, owned the facilities of production. He declared that they could only acquire this ownership through revolution, and to foster that revolution, he preached the doctrine of class hatred. He saw workers and owners as natural and eternal enemies. And so, more than a century ago, he started the "Hate-Your-Boss" campaign which persists to this day—even in America, unhappily.

But in developing this theory, Marx made one fatal mistake which has spread misery and suffering all over the world: He thought that public ownership and Government ownership were one and the same thing. And of course, they aren't. They are poles apart as millions of wretched people have discovered to their sorrow.

The workers in Russia had their revolution, but they do not own the tools of production. The State owns the tools; the Commissars own the workers; and the workers own nothing at all.

Then the workers in England had their revolution, too . . . a quiet little revolution which was fought with ballots instead of bullets, but which placed Labor in absolute control of the government for six years. And during this time the government—acting in the name of Labor—took over virtually all of the key industries in Britain, but still the men who worked in the coal mines, in the steel mills and on the railroads did not own the tools of production.

The government owned them, and while Labor in turn, owned the government—after a fashion—the men themselves soon found that they had merely traded one set of bosses for another. Instead of taking orders from the former owners of these enterprises, the workers now took their orders from the bureaucrats, and the very first thing that these bureaucrats tried to do was to show a profit on these state-owned operations. To that end they raised prices substantially and repeatedly, and they resisted wage increases with a determination and force that government alone can command.

To this day the pay of the British steelworker is only about one-third as much as is paid to the average worker in our American steel mills; and now a disillusioned England has turned its back on the Marxist philosophy and is trying hard to unscramble its Socialistic omelet.

In his thirst for revolution, Marx overlooked completely the only economic system on earth under which it is possible for the workers themselves to own, to control, and to manage directly the facilities of production. And shocking as the news may be to the disciples of Karl Marx, that system is Capitalism.

The truth is that here in America we have real and direct public ownership of our biggest and most important industries. That ownership is sold daily, in little pieces, on the stock market. It is constantly changing hands, and if the workers of this country truly wish to own the tools of production, they can do so very simply.

They do not have to seize the government by force of arms. They do not even have to win an election. All in the world they have to do is to buy, in the open market, the capital stock of the corporation they want to own—just as millions of other Americans have been doing for many decades. So why should they do it the hard way?

I imagine that some of you may be saying: "Oh, that's all very good in theory, but of course it isn't possible in practice. No group of workers could ever purchase the great multi-billion dollar corporations that we have today." The fact is that, at today's market prices, the employees of U. S. Steel could buy every share of the outstanding common stock of the Corporation almost as easily and just as cheaply as they can purchase a moderately good automobile.

We have approximately 300,000 employees. That is not just steelworkers, of course. It is all our workers—including me. And together, they could buy all the common stock of the Corporation by purchasing just 87 shares apiece. At today's prices, those 87 shares would cost them a total of less than $3,500. And at today's wages the average steelworker earns that much in approximately ten months.

By investing $10 a week apiece—which is about what our steelworkers gained in the recent wage increase—the employees of U. S. Steel could buy all of the outstanding common stock in less than seven years, and—except for the relatively small fixed sum that is paid in dividends on the preferred stock—our workers would then be entitled to receive all of those so-called "bloated profits" they have heard so much about. But here, I'm afraid, they would be in for a disappointing surprise. At current rates, the total dividend on their 87 shares would amount to only $261 a year.

In order to control U. S. Steel, these workers would

Typical steelmaker Donice B. Williams of the Maywood Plant of U. S. Steel's Consolidated Western Steel Corporation, Los Angeles, California.

Steamer *Benjamin F. Fairless* of U. S. Steel's Pittsburgh Steamship Company turning in the slip at Gary Works of U. S. Steel, Gary, Indiana.

not even have to purchase 87 shares apiece. Sixty-two shares of common stock would give them a voting majority in the Corporation's affairs. That would cost them less than $2,500, at the present market, and an investment of only $5 a week would turn the trick in less than ten years. Then they could elect their own Board of Directors, fire the present management, put CIO Steelworkers' president in my job, if they wished, and run the business to suit themselves.

Before they become too overjoyed at this prospect, however, I think they should be warned that they still would not be their own bosses, of course, for the true bosses of every American business are its customers, and unless those customers are satisfied as to the quality, quantity and the price of the product, there will be no business and there will be no jobs. But as long as the new owners of the company could keep the customers happy, they could run the show exactly as they pleased.

Now perhaps I should make it perfectly clear at this point that I am not advocating that our employees go out and buy control of United States Steel. I don't think that would be good either for the workers or the Company, and from the standpoint of the national interest, I think it is far better that our key industries should be owned—as they now are—by a broad and representative cross-section of the whole American public . . . by the workers in many different fields of enterprise, by the consumers of all kinds of products, by schoolteachers, and businessmen, and widows and pensioners—in short, by the average American.

I CAN'T help feeling that if the workers in America ever did own the tools of production, all of us would quickly learn a few very fundamental and very simple economic truths that have somehow escaped a great many of our people.

We would learn that this endless conflict between owner and worker is the sheerest, unadulterated folly; for when we fight over profits, we are fighting over peanuts.

Of the total sum which the workers and the owners of U. S. Steel divided up between them last year, more than 92 per cent went to the workers, while less than 8 per cent went to the owners. Yet that small share which went to the owners was the total "rent" we paid them for all the billions of dollars worth of plants and furnaces and facilities we used in making steel. And without these facilities, of course, our men could not have made any steel at all.

Let the workers take one-tenth of everything the owners received for the use of these tools, and what would they get? Peanuts, less than a dime a day. But let them go whole hog and grab all of the owners' share . . . let them wipe out all of these dividends completely and forever . . . and what happens then? They would destroy the company, destroy their jobs, work infinite harm upon a vast segment of our national economy and wipe out the savings which more than 275,000 of their fellow Americans have invested in our business. And for what? For the price of about three cartons of cigarettes a week, apiece!

American workers will never improve their standard of living by grabbing the meager share which the owners get from our present economic pie. They will only do it by producing a larger pie with a bigger share for everyone.

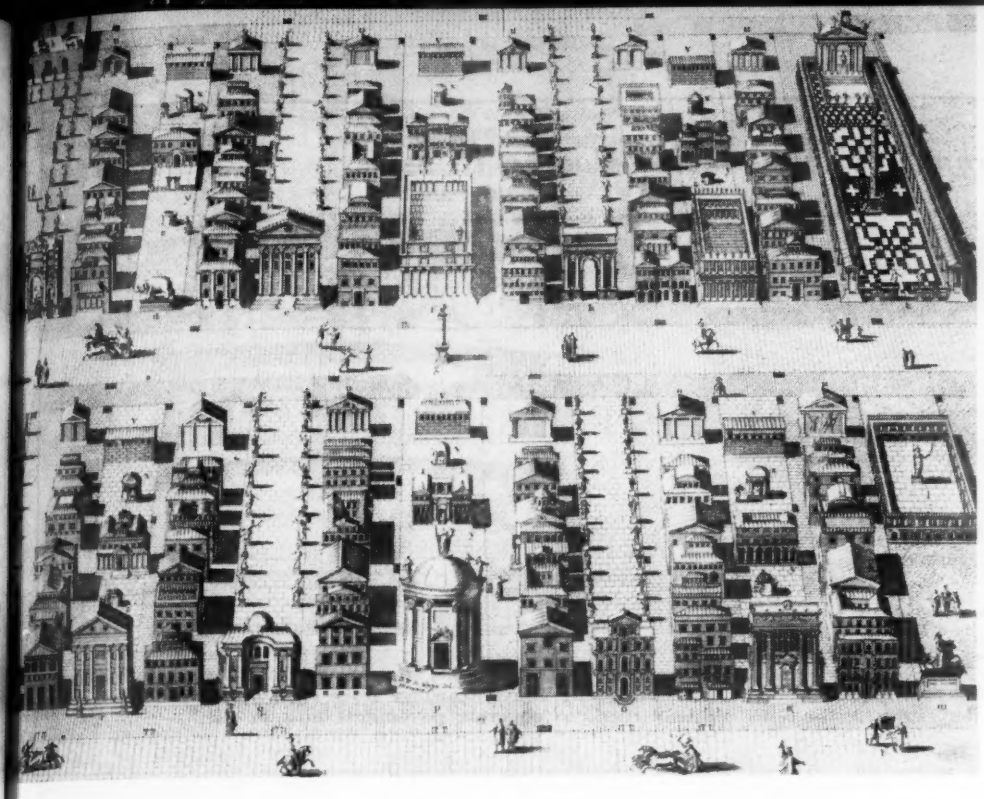
If we produce more goods we shall have more goods to divide among ourselves. If we produce fewer goods we shall have less to divide and less to live on. For no matter how many billions of dollars we may have in our collective pocket as a nation, we cannot buy more than we have produced, and the dollars themselves mean nothing. They are only paper, and we cannot eat them, wear them, or build a house of them.

And there we have the simple, economic truths of the matter. To live better we must produce more, but production is the result of teamwork, not of conflict. We cannot produce by fighting each other and hating each other, for by doing that we destroy ourselves. And we shall only achieve our fullest measure of production when we begin to understand that the interests of worker and owner are not antagonistic, but identical . . . that under our American system of enterprise it is impossible for one to prosper while the other suffers.

That is the lesson which, somehow, we must learn, yet we find people today—both in and out of the crackpot fraternity of Karl Marx—who are trying to keep us from learning it. They seek to breed suspicion and distrust among us. They tell us that one economic group is the "natural enemy" of another, and they ask us for vast political power so that they can "protect" us against those nonexistent economic enemies. In short, they follow the old political maxim: "Divide and Rule."

SAD to relate, that policy has served them well on occasions, but it has always served America ill. There is no future in it for us or for our people. But there is a future—and a very great future—for every American in protecting and perfecting the only economic system in the world where men and women, in every walk of life, can and do own the tools of production.

This country can attain security only through its steadfast determination to unite and produce by gainful collective bargaining with government guidance rather than absolute control.—*End.*



An American Engineer Photo Story

Roman streets showing miles of roadway are depicted here. Roman roads throughout the empire were mainly treeless to aid the sun in drying them quickly after heavy rains.

THE ROMANS KNEW THEIR ROADS

FOLLOWING up recent dispatches from many sources showing the decrepit state of the United States highways, the AMERICAN ENGINEER did a little digging in the musty files of history on the subject of roads—and came up with a picture story that we believe will be of considerable interest to engineers.

According to the National Geographic Society, a current survey by a group of American engineers recently revealed that the 2,000-year-old Roman Highway, the Appian Way, is in better condition today than many of our modern highways. Many other fine roads built at the time of the Roman Empire, in England, France and North Africa, are in an excellent state of preservation. The firm roadbeds of many others are being utilized today, particularly in England, merely with modern resurfacing material.

These ancient roads have withstood the ravage of time, weather and traffic in a truly amazing manner. It has been estimated that a modern highway's life span is about 20 to 30 years; yet, the Appian Way, constructed in 300 B.C., has survived the travel of all the intervening centuries —a record for longevity.

It costs the American taxpayer some $4 billion annually to create, administer and maintain roads in the United States. It is one of the heaviest investments the taxpayer makes each year! Billions of dollars of the national income are produced from the highways: Major industries such as the automobile industry, motor gasoline and oil industries, tires, trucking, to mention a few, depend upon it

This print by the Bureau of Public Roads is of a macadam road being built in 1823.

From Ancient Rome to Modern U. S. . . .

ANCIENT ROMAN 2-LANE MILITARY ROAD.

FRENCH ROAD (ROMAN METHOD) PREVIOUS TO 1775

TRÉSAGUET ROAD, FRANCE, 1775 TO 1830

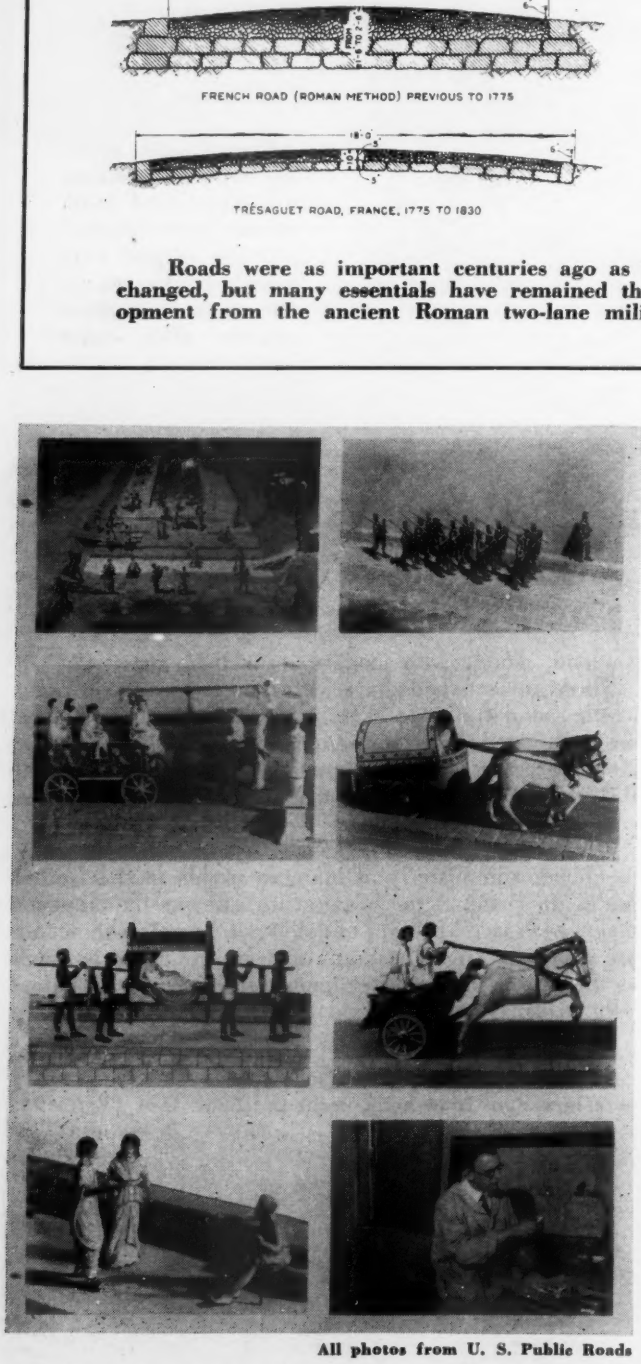
TELFORD ROAD, ENGLAND, 1820

ORIGINAL MACADAM ROAD, ENGLAND, 1816

MACADAM ROAD, UNITED STATES, 1900.

HEAVY-DUTY 2-LANE CONCRETE PAVEMENT, UNITED STATES, 1934

Roads were as important centuries ago as they are today. Methods of construction have greatly changed, but many essentials have remained the same. The above drawings trace road building development from the ancient Roman two-lane military road, to concrete pavements now in use.



All photos from U. S. Public Roads

This diorama begins with picture showing all stages of a highway in the process of completion (upper left). Upper right, the armies use a highway recently completed. Then, in order, a cart of Roman citizens use a portion of the road; a covered chariot plods along the route; a hand-carried litter in which a Roman woman reposes; a chariot racing down the excellently paved road; two pedestrians walk along the road and a beggar sits on the curbing-stool; a Public Roads official molds the tiny figurines used in the diorama study of an ancient road.

for a livelihood. Considering this heavy investment and the enormous revenue, perhaps a re-evaluation of basic engineering principles of the Roman roadbuilders is in order.

In the days of the Roman Empire the tools were simple but adequate. Our 20th century rush had not bothered the Roman road engineers. Time was no object. Vast hordes of slaves, soldiers and freedmen were employed to produce the magnificent roads of the time. Today, it would probably cost about $500,000 a mile to reproduce the hand built Roman road. Today's heavy duty, two lane highway, with modern machinery, costs from $60,000 to $100,000 per mile.

Surveying instruments were known in the ancient world. The first record of a precision surveying instrument is as early as the 2nd century B.C., claimed by the Greek mathematician Hero. The instrument used was a *Dioptra*.

The lack of status that worries too many highway engineers today was no problem among the Romans. Only officials of the highest rank were permitted to plan the Roman roads and execute them. The Emperor Augustus was one of a long line of noble Roman road engineers.

ONCE the highway plan was inaugurated by the ruling emperor, work was assigned and gotten under way. After the roadbed was cleared, the ground was broken by an oxen and wheel plow. Picks and shovels were employed in excavating and removing the soil to a solid foundation often down to five feet deep. Slaves transported baskets of waste fill from the area and replaced it with solid earth. This was tamped with a beetle and compacted with a hand-roller to provide a hard, solid, smooth foundation.

The Romans knew how to make cement (a secret lost to the Western World for many centuries), and laid upon the subgrade a fine layer of mortar prepared by mixing lime and sand together. This was spread with either a long handled trowel or a rake.

Masonry workers fitted huge blocks of soft stone on the subgrade by hand. The stones were carried by porters by cords suspended on poles across their shoulders. The lever principle and the use of the crowbar was applied in setting the huge stones in place.

Lime or hydraulic concrete was applied over the lower courses and blocks of hard lava were used for the surfacing. Many times the lava was hauled over long distances. Roman roads spreading out from Rome throughout the Empire totaled over 50,000 miles and the main military highways were almost all built in this manner. Often a final smooth course of concrete was applied to the surface of the lava but generally the polygonal shaped lava blocks constituted the surface.

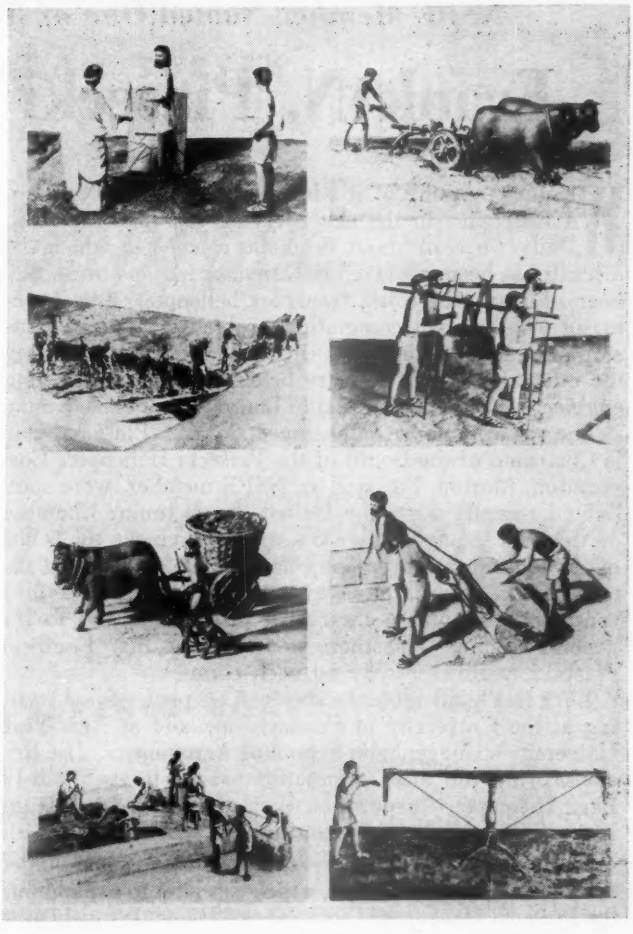
The magnifying glass and compass were apparently unknown. The range of all instruments was restricted to what could be seen with the naked eye. However, even with their crude instruments, the Romans achieved a skill in roadbuilding unequaled until modern times.

The Romans constructed various types of roads depending upon their probable use. The *Via* was the term applied to the common road or highway as we think of it today. These were usually built about 8 feet in width. The main or military highways, such as the *Via Appia,* however, were built in three sections. The middle part of the road was usually about 16 feet wide of paved surface. This section of the road was separated from the sides, or the *margines,* by a curb about two feet wide by 18 inches high. This curbing served double duty as seats for travelers as well as a division for the wheeled traffic from the pedestrian traffic. The *margines* were similar in many respects to our present day sidewalks, though horse traffic was permitted upon them.

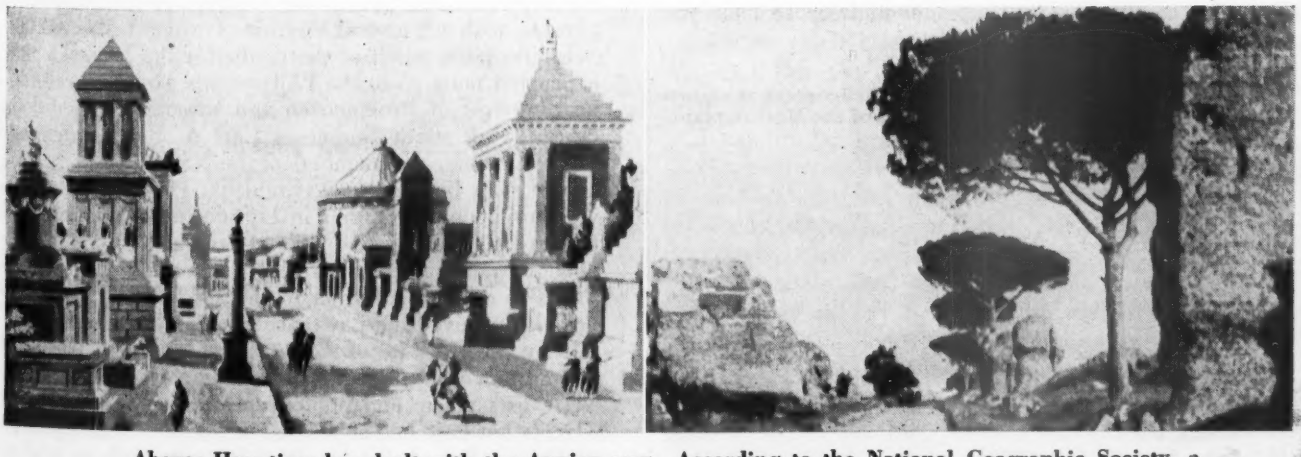
Roman roads are remarkable for traveling a straight course, regardless of obstacles. The *Via Appia* is particularly noted for this. At one point near Terracine, solid rock was cut away to a height of 120 feet to allow the road to pass.

From the magnificent ruins of Roman bridges and aqueducts throughout western Europe it is evident that Roman engineers used their skills to cross rivers and ravines as facilely as we do today.

Sometimes, the AMERICAN ENGINEER feels, it is instructive to go back into history for the lessons it teaches. Could it be that our highway system could with profit borrow from the Roman roadbuilders? What do you think? The AMERICAN ENGINEER would like to hear from its readers on this subject. Members of NSPE should have many constructive comments and suggestions to offer on America's highway problems.—***End.***



This diarama presents stages in construction of a Roman Highway. Picture at upper left shows the planning stage; at upper right, the digging of the trench to lay the road's foundation. Then, in order: workmen carrying away the rubble; four laborers carrying the huge lava blocks to lay the foundation of the road; a laborer and his oxen bringing in material for concrete; concrete being rolled; a finishing stage of laying polygonal lava blocks for the surface; the cycle is complete and surveying proceeds for the continuation of the highway.



Above: How time has dealt with the Appian way. According to the National Geographic Society, a current survey by a group of American engineers recently revealed that the 2,000-year-old Roman Highway is in better condition today than many of our modern highways. Many other fine roads built at the time of the Roman Empire, in England, France, and North Africa, are in an excellent state of preservation. The firm roadbeds of many others are being utilized today, particularly in England, merely with modern resurfacing material added.

NSPE Member Named One of Nation's Ten Outstanding Young Men

Frank N. Piasecki Wins Jaycee Award

WE think nothing of it when we look up now and see a helicopter in the sky carrying the intercity mail. Daily we read about dramatic rescues in which the aircraft has been employed in Korea, or in flood areas. We hear of plans for using transport helicopters like buses to solve interurban commuting problems. Yet few of us stop to think that a major share of the credit in pioneering the infant helicopter industry belongs to one alert young engineer—Frank N. Piasecki of Lansdowne, Pennsylvania.

The remarkable accomplishments of Mr. Piasecki, who is Chairman of the Board of the Piasecki Helicopter Corporation, Morton, Pa., and an NSPE member, were spotlighted recently when the United States Junior Chamber of Commerce named the 33-year-old engineer to its list of the ten outstanding young men of 1952. Choice of the men for the awards is always predicated on outstanding contributions both to their own professions and to the general welfare, and there is no doubt that Engineer Piasecki qualifies highly on each count.

Born in Philadelphia, he received his professional training at the University of Pennsylvania and at New York University's Guggenheim School of Aeronautics. His first engineering job after graduation was with the Platt-Le Page Helicopter Corporation where he worked in designing rotor controls and transmission mechanisms.

In 1940, with five fellow aviation enthusiasts, he founded the PV Engineering Forum, which was later to expand into the Piasecki Helicopter Corporation. The young men, each a specialist in some branch of engineering, began holding their informal discussion and experimental meetings in an empty store heated only by a coal stove. With the advent of World War II, however, Piasecki spurred his companions on to obtaining enough financial support to produce the experimental PV-2, a one-man helicopter which won for its designer the attention of the Navy Department after its successful testing in 1943.

The PV-2, for which, incidentally, Piasecki himself served as test pilot, had many new features—a weight of less than 1000 lbs., perfectly balanced blades, and a control system practically without lag. It was, however, of the small, conventional type; and what the Navy needed was an aircraft that could carry a payload of at least 1800 lbs., that could, of course, accommodate more than one man, that could, for instance, land on the deck of a vessel rocking in rough seas, and successfully handle the shifting and unpredictable load to be met in rescue work.

Frank N. Piasecki, pictured at the right, has played a dramatic role in the growth of the now-flourishing helicopter industry. Because of his contributions to its development, the young aeronautical engineer has won nationwide recognition and has been accorded several national honors.

With these specifications before him, Piasecki went to work, and in 1945, through his efforts, the world's first tandem transport helicopter was completed and flown, thus marking a great new advance in aeronautical history and preceding the development of all other transport helicopters by three years.

Piasecki helicopters were used by the U. S. Marine Corps to develop the airborne assault tactics which enable troops to be moved to strategic points by air. In addition to such transport uses, the Marines, the Navy, and the Air Force employ tandem helicopters for rescue work, utility work, and anti-submarine warfare. A soon-to-be-completed model will carry up to 44 persons.

EVOLVING from the group of six young engineers, studying problems of aeronautical engineering in their spare time—the original PV Engineering Forum, the Piasecki Helicopter Corporation now employs more than 450 persons with an annual payroll of around $20,000,000.

Incidentally, much of the credit for the Piasecki plant expansion must go to the Philadelphia architectural engineering firm of Rosengarten and Kraemer, who did the design work. Both Engineers Carl A. Rosengarten and G. W. Kraemer are members of the NSPE.

The man behind it all, Frank N. Piasecki, who lives with his widowed mother in Lansdowne, can surely look forward to even greater accomplishments in his already phenomenally-successful career. In token of his accomplishments to date, in addition to the 1952 Jaycee award, he has also received the Lawrence Sperry award given annually by the Institute of Aeronautical Sciences. The latter recognition was accorded him in January 1951.

He lists music and photography as his main hobbies. (His father once had hopes that he would become a concert violinist.) But one of his chief interests both on and off the job is working to raise the standards of the engineering profession and to wake up the country to the pressing need for more and better technical education for the engineers of the future.—***End.***

Below, one of the Piasecki tandem helicopters is shown coming down on a landing strip in front of the Morton plant.

—Part Two of Two Parts—

EXECUTIVE RESEARCH SURVEY NUMBER TWO

How to Improve the Utilization of Engineering Manpower

Prepared Under the Direction of

THE PROFESSIONAL ENGINEERS CONFERENCE BOARD FOR INDUSTRY

THIS report is a *summary* of the second of a series of Executive Research Surveys begun in 1951 by the National Society of Professional Engineers, through its Professional Engineers Conference Board for Industry. It pools the experience of more than 495 companies employing engineers, on the subject of "How to Improve the Utilization of Engineering Manpower"

The purpose of the research program is to assemble and publish current information on engineering-management relations for the benefit of industrial employers of engineers and the engineering profession.

The report as published appears as a 55-page book—see page 24 for more information.

The first part of this condensation appeared in the February, 1953, issue of THE AMERICAN ENGINEER.

CHAPTER VI

engineering turnover . . . causes and results

CHAPTER SUMMARY

Engineering turnover a serious problem
- Some major contributing factors
- Company-sponsored benefits help reduce turnover
- Incentives important to engineers
- Professional engineers exempt from salary controls

Military demands reduce engineering manpower supply
- Reserve requirements a particular problem
- NSPE's (recommendations) draft and reserve policy
- Engineers in vital industries perform their patriotic duty

Defense program requires many engineers
- Defense and defense-supporting industries have highest demand
- Other companies have about same 1940 ratio of engineers to employees
- More engineering man-hours required than ever before

ENGINEERING TURNOVER— A SERIOUS PROBLEM

ENGINEERING turnover is particularly serious in the industries and areas where the shortage is most acute and the recruiting of engineers is most active.

Engineers most in demand include aeronautical, electronic, mechanical and electrical engineers. This does not mean that other classes of engineers aren't also in great demand. But it is in the groups mentioned that the turnover is greatest.

Forty-two per cent of the companies surveyed reported that they found engineering turnover a problem in maintaining an efficient engineering staff. Military demands have contributed substantially to the turnover. Other factors which were mentioned often included: possibilities of independent work, "grass is greener," national anxiety, competitors will pay high prices for our know-how, young engineers moving to obtain wider experience, the human need for change, competition, more money traded for stability and opportunity, military service and pirating, promotion to executive positions, better advancement with larger firms, and aggressive recruiting and advertising by others.

Of interest here is the comment made by the president

Editor's Note: Asterisks throughout the text indicate deleted portions from the original report.

of a small firm. He said: "The way for the small firm to keep their engineers is to treat them as professional people, pay them adequately, keep them informed, and give them some prospect of professional development. The firms who do this are still subject to 'pirating' but to a much less extent than those who regard their engineering employees as expendable material."

COMPANY SPONSORED BENEFITS AND INCENTIVES HELP REDUCE TURNOVER

The dictionary defines benefits as "Whatever promotes welfare." Incentives are defined as "motives, whatever incites to action."

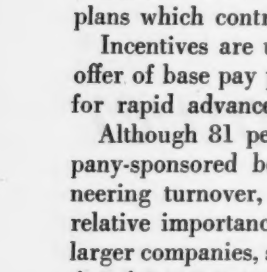
Benefits include hospitalization, insurance and pension plans which contribute to the employees' welfare.

Incentives are usually financial such as more pay, the offer of base pay plus profit sharing, and the opportunity for rapid advancement.

Although 81 per cent of the companies felt that company-sponsored benefits are effective in reducing engineering turnover, many of them pointed out that their relative importance has declined, particularly among the larger companies, since most of them now have hospitalization, insurance and pension plans.

Generally, it was indicated that the various *incentives* which the companies offered *were more important than the benefits* to engineers. The basic reason given for this was that the incentives offered by an individual company enabled it to afford the engineer advantages which could not be secured in most other companies.

The relative importance of the incentives was given as follows:



1. Opportunity for advancement
2. Stability of employment
3. Chance to receive extra training
4. Essential industry
5. Profit sharing plan

EFFECT OF SALARY CONTROLS

The Survey indicated that Salary Stabilization Board regulations had proved costly in terms of lowered morale and loss of key personnel. A number of companies responded that these regulations had an adverse effect upon their wage situations.

In considering continuation and amendment of the Defense Production Act, in the Spring of 1952, Congress was made aware of this situation by representatives of NSPE. In testimony before the Congressional Committee, NSPE representatives requested the treatment of engineers as professional people similar to that provided in the original Defense Production Act for lawyers and doctors. Senator Flanders, in commenting on this portion of the Act, stated on the Senate Floor: "The professional engineer does not simply perform a routine duty, no matter how well it must be done. He is a creative person and we cannot apply salary controls to such a man."

As a result, the law as passed contained provisions exempting from salary controls as of July 1, 1952, all professional engineers employed in a professional capacity.

The freeing of professional engineers from salary controls should in a large measure overcome the salary control problems noted by companies participating in the Survey. These notations showed that salary controls contributed substantially to engineering turn-over. Exemption from salary control will permit additional incentive to retain professional engineers in engineering capacities. Many engineering graduates in the past have turned to other fields of endeavor because of more lucrative opportunities.

THE EFFECT OF MILITARY REQUIREMENTS

One of the major demands on the limited engineering manpower is the increase in the requirements of the armed forces. Much study and time has been devoted to working out an equitable solution but the situation remains unclear.

It is estimated that half of last year's class of engineering graduates were diverted to the Armed Forces through the draft, R.O.T.C. and the calling up of Reserve and National Guard units. All graduates commissioned in R.O.T.C. and about half of the enlisted members of the Reserve and National Guard were prompty called to active duty. This serious diversion, coupled with increased defense demands, has depleted the number of engineers available to industry. It is unlikely that the June, 1952, graduates were in less demand by the military.

The difficulty of obtaining deferments for their engineering personnel has kept many companies from seeking them. Only 38 per cent of the survey participants requested deferments for their young engineers eligible under Selective Service. A somewhat higher number, 43 per cent, asked that their engineers in the Reserve be granted deferment. The replies showed that the deferment is granted less often in the Reserve group which generally constitutes the more highly-trained engineers. When engineers are deferred, it is usually for six months only. A number of the firms find that their engineers feel it is hardly worth the trouble and do not request deferment.

An electrical manufacturer making transformers and other electrical components important to the defense effort states that military policy concerning men in the Reserves is particularly short-sighted. He comments: "The services feel they own these men and give little consideration to the engineering urgency in industry to serve the defense effort."

This policy dates back to the period when the Reserves were a small, highly-specialized group. Since World War II, the size of the Reserves has increased so greatly that a sizable number of engineers are now in the Reserves. Engineering groups are seeking to make the Defense Department aware of the role which civilian engineers can play in supplying them with the best available war material.

Admiral Ben Moreell, Civil Engineer Corps, USN (ret.), chairman of the board, Jones and Laughlin Steel Corporation, served as a member of the Scientific Manpower Advisory Committee. In a recent article in *The Saturday Evening Post*, he pointed out that the inefficient scientific manpower policies of World War II had disastrous effects upon our war effort. The Admiral urged that action be taken to insure that American technology is kept ahead of that of any potential aggressor.

HOW CURRENT DEFENSE NEEDS AFFECT ENGINEERING REQUIREMENTS

As might be expected, the effect which the defense program has had upon the companies and their engineering staffs varies greatly depending upon the type and size of each business.

In defense and defense-supporting industries the ratio of engineers to total employees has changed from an average of one engineer to every 40 employees in 1940 to about one engineer to every 20 employees in 1952. The ratio of engineers to total employees is understandably high in engineering consulting firms where it may be as great as nine engineers to every ten employees.

Such industries as petroleum refining and electric light and power production, although large employers of engineers, estimate that their ratio of engineers to total employees has remained about the same since 1940.

Defense production requirements may be as high as 95-100 per cent (aircraft, jet propulsion, etc.) or as low as 2-5 per cent (petroleum refining, flooring, etc.). In a large number of defense-supporting companies, defense work accounted for about 50 per cent of their total production.

It is evident that no set pattern exists concerning the effect of the defense program on all industry. Rather, it varies with each company and each industry depending upon its participation in defense work.

The present demand for engineering manpower is by no means based upon defense alone. Modern industrial, business and civilian development requires more engineering man-hours than ever before. This demand keeps pace with the growth of the nation's economy.

CONCLUSIONS

Engineering turnover is causing concern in many industries. Incentives offered by the individual firms are of more value in retaining engineering staffs than are hospitalization and insurance benefits which have become adopted generally.

The exemption of professional engineers from salary controls should have a good effect upon the inability of companies to meet salary competition.

Draft and Reserve manpower demands seriously affect engineers in industry. As yet, no efficient policy has been worked out to insure maximum use of scientific manpower.

Effects of the defense program vary according to the industry and its size. The ratio of engineers to employees in defense and defense-supporting industries has risen from approximately one engineer to 40 employees in 1940 to about one engineer to 20 employees today.

CHAPTER VII

preparing the engineers of the future

CHAPTER SUMMARY

Industry and education should stimulate interest in engineering careers

- Industry can promote interest in engineering careers
- Traveling exhibits of large companies stimulate interest
- Scholarships and other educational grants
- Educational assistance for shop personnel and employees' children

Universities and colleges can help

- Cooperative student programs with industry
- Emphasis on well-trained engineers
- Engineering professors and instructors for part-time jobs
- Expand cooperation with industry

Unsuccessful engineering students are talent source

- Almost 50% of students fail to complete engineering courses
- Train for career as technical aides

THE need for interesting students and vocational guidance counselors in engineering as a career is well understood by most companies, according to the survey results. Copies of carefully prepared booklets and folders are distributed to the schools and colleges by the larger companies. These present the opportunities in engineering as they apply to these companies and give an indication of the impressive part which engineering plays in their activities.

In smaller firms, the aproach to the schools is on a more personal basis and usually involves talks by company executives to student groups. These firms often participate in "Career Days," at which representatives of local industries brief the students on the opportunities open to them.

In order to give their relations with schools and colleges a more personal approach, the larger companies send representatives around the country to contact them. Most of these representatives also visit the engineering colleges to recruit young engineers for their companies.

Efforts to interest and stimulate students to consider science as a career are sponsored by several of the larger companies in the form of traveling exhibits. Examples of these are the General Motors show, "Previews of Progress," the Westinghouse, "Energy in Action," and General Electric's "House of Magic." Although such shows play to civic clubs and other like groups as well as to high schools, they serve to encourage interest in science among parents and students which, in turn, increases the number of students who consider engineering careers.

In addition to these efforts to urge students to consider engineering as a career, a number of companies participate in student guidance clinics and summer training programs. The importance of engineering in industry's operations is demonstrated in practical form by displays of working models of plants and equipment as well as guided trips through factories, laboratories and other industrial facilities.

INDUSTRY PROVIDES ASSISTANCE

It is accepted as necessary to stimulate the interest of students and their parents in engineering as a career. However, the problem of obtaining more engineers will continue to exist unless it is made possible for all promis-

ing students to study engineering. In some cases, the students do not have the financial resources to undertake this expensive training. Industry can help by providing scholarships for worthy students.

The survey disclosed that this is being done in many companies and that there are a number of different types of scholarship assistance. Some scholarships specify that the recipient must work for the company upon graduation while others do not insist upon this.

Two factors which vary considerably are the amount and the length of the scholarships. Some are full scholarships for the entire college period while others are specific grants which cover part or most of the tuition for certain periods.

It is reported that the granting of scholarships to the children of employees not only encourages them in their studies but also has a healthy effect upon employee morale and labor relations.

One large aircraft manufacturer grants engineering scholarships to students and to all employees, including shop personnel. Scholarships are also given for the study of engineering subjects at night school. This policy takes advantage of the opportunities to train engineers from among employees who have the benefit of actual shop experience. It also encourages employees with lesser skills to train for jobs as engineering aides and technical assistants. This results in improved employee morale. Additional engineers and technical assistants are made available to ease the workload of the present engineering staff. The fact that these people have production know-how makes them highly effective engineering aides and engineers.

In addition to scholarship awards to individuals, some firms make grants to engineering colleges, donate engineering laboratory equipment and components, and work with the colleges to make engineering students more effective and available in less time. Where the engineering colleges and the companies are neighbors, the students often work on a cooperative basis.

WHAT ROLE CAN EDUCATION PLAY?

The demand for young engineers has increased pressure on the engineering colleges to turn out a maximum number of well-trained engineers. Prior to their graduation, the students are the objects of extensive recruiting campaigns by many companies which sorely need engineers. One educator commented in a recent *Life* magazine story concerning the recruiting efforts: "It's like a fraternity rush; and it's bad for the boys."

Some companies which have serious engineering manpower problems have been forced to relax their requirements somewhat in order to fill their needs. However, at least one large company emphasized that it had not relaxed its standards. Its spokesman commented: "By selecting only top-flight engineers from the colleges, greater production can be obtained from them as employees."

Many educators fear that industry's demand for engineers may encourage the over-extension of engineering college facilities. This could cause a decline in their educational standards. They want industry to supply them with the financial backing necessary to increase their student capacity and improve their teaching facilities.

At present, most private engineering colleges use a quota system limiting the number of students in each engineering field. This seeks to avoid over-taxing the capacity of their teaching staff, their space and their laboratory facilities. By so doing, they feel that they can avoid lowering their educational standards.

* * *

CONCLUSIONS

Education and industry can both benefit by working in harmony to make the maximum number of well-trained engineers available in the least possible time.

Industry can help to insure the supply of engineers by granting scholarships to worthy students as well as to its employees and shop personnel who show the requisite ability. In addition, it should support engineering colleges in ways that they may improve their training facilities and enhance their teaching facilities.

Industry can help attract competent men to the teaching profession by offering counseling and part-time jobs to supplement their low incomes as professors and instructors.

It can also cooperate with the colleges in making arrangements to provide enginers as part-time teachers.

Engineering specialists and retired engineers should also be urged to teach on a part-time basis.

Education, in turn, can strive to produce engineers with the best possible training. It can counsel those students who do not complete their engineering courses to train as engineering aides at technical institutes or with companies which have their own training programs. The colleges can work with neighboring companies on a cooperative student plan. In addition, they can re-examine their curricula to make certain that it suits today's needs.

Through such cooperation, the greatest possible utilization of engineering and technical talent will be achieved.

CHAPTER VIII

how to improve the utilization of engineering manpower... summary and recommendations

CHAPTER SUMMARY

Engineers' work is evaluated by periodic appraisals

- Semi-annual, annual and quarterly appraisals
- Psychological tests
- A case history summary

Engineering staff potential for advancement generally rated good

- Engineers do not always have top rating
- Engineers might review work and potential for advancement
- The Engineer Utilization Checklist

HOW DOES MANAGEMENT EVALUATE ITS ENGINEERING STAFFS?

PERIODIC appraisal plus personal observation appears to be the most popular method of evaluating the work of the engineering staffs. There are differences of opinion among survey participants about the most effective periods for appraisal. The most common periods used are semi-annual, annual and quarterly. Semi-annual work appraisals are most frequently used by the companies surveyed.

There are, of course, many refinements of the evaluation techniques used. One large electrical manufacturer uses the following comprehensive rule:

"All prospects are rated on nine factors: loyalty, experience, training, knowledge, disposition; ability to cooperate, to supervise and to delegate, and the opinion of associates."

Psychological tests are being used by many of the larger companies which retain industrial psychologists or psychiatrists. One large aircraft manufacturer uses a program of psychological ability, interest and personality tests. An oil refining company combines another factor with industrial psychology; it evaluates its engineers by: "a. careful observation of performance during short-term promotions to sub-supervisory assignments; b. use of industrial psychologists for testing and evaluating the potential of all likely material for supervisory assignments within the engineering department."

HOW HIGH IS THE POTENTIAL OF THE ENGINEERING STAFF RATED?

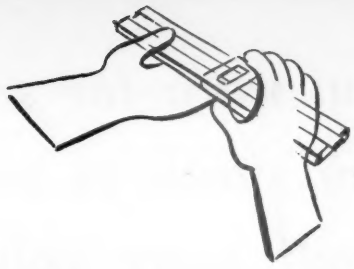
Although the majority of survey answers indicated that the potential for advancement of the present engineering staff was either excellent or good, there were some replies which indicated that the potential was fair, satisfactory, limited or not good. In one case, it was rated poor. Although these less favorable replies were in the minority, there were enough of them to indicate that industry is not entirely satisfied with work of its engineering staffs or their potential. The spokesman for a large steel manufacturer commented concerning engineering turnover: "No problem; just a shortage of good, trained engineers (plenty of poor ones)."

This suggests that engineering staffs would do well to review their work and their potential for advancement to determine whether or not they are meeting their companies' needs and their own professional standards. By this analysis, they can check on their performance and methods whereby they can increase their potential for greater responsibility.

THE ENGINEER UTILIZATION CHECKLIST

One of the methods whereby industry can determine whether or not it is making the most efficient utilization of its engineering manpower is through a survey of its present engineering staff. This can be accomplished by the use of an "Engineer Utilization Checklist."

In order to avoid any misunderstanding, the purpose of the list should be explained, i.e., (this checklist is designed to free you from routine tasks and enable you to devote your time to more purely engineering work). The checklist seeks to determine from the engineers:

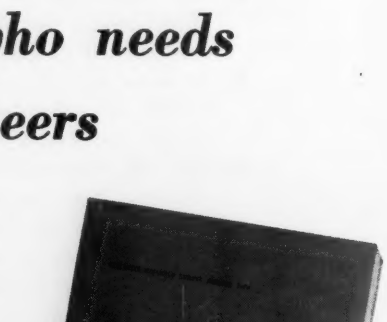


1. What jobs or tasks are you now performing which could be turned over to technical specialists? Please give *specific* details.
2. Are there any of your duties which could be simplified so that part or most of them could be turned over to subordinates?
3. Is there any of your administrative detail work which could be done by non-engineers or competent secretaries?
4. Can you suggest how the training program for recent college graduates could make them better equipped to be of assistance to you?
5. What changes or improvements in organization and planning would you recommend to lessen the engineering staff's work-load?
6. Do your working conditions enable you to do your work with peak efficiency? Have you any recommendations for their improvement?
7. Have you any recommendations to offer to make the indoctrination program for newly-hired college graduates and experienced engineers more effective?
8. How can shop personnel be made more effective in their assistance to you? Have you any shop person(s) you would like to recommend for training as a technician?
9. Do you know of any person(s) within the administrative or manufacturing sections of the company who would make good technical assistants or who would be interested in training for such work? Anyone outside the company? May we have their names?
10. Do you consider your communications with management and your supervisors satisfactory? If they could be improved, what are your suggestions?
11. Is there any of your routine work which could be performed by mechanical aids or made easier through their use?
12. May we have any other suggestions which you may have for relieving the engineering staff of routine detail so that they may concentrate on purely engineering work?
13. Do you have any suggestions concerning cooperation with local schools and colleges for training student engineers? For use of their facilities? For retaining professors and instructors as consultants and part-time employees?
14. Are there any engineering operations which could be changed in order to reduce or eliminate waste time and motion?

The Engineering Utilization Checklist can be tailored to suit the requirements of each company. Chief importance of the checklist is stimulating the engineering staff to think about and suggest methods for concentrating on engineering and turning over routine details to subordinates.—**End.**

If you work for someone and want to make yourself more valuable . . . or if you are an employer who needs engineers

you'll want this book!



LOOK AT THESE CHAPTER TITLES:

CHAPTER I	Indoctrinating engineers—Suggestions for programs
CHAPTER II	Making the existing engineering staff more effective
CHAPTER III	The use of supporting personnel
CHAPTER IV	Are engineers' talents being wasted?
CHAPTER V	Auxiliary sources of engineering talent
CHAPTER VI	Engineering turnover—Causes and results
CHAPTER VII	Preparing the engineers of the future
CHAPTER VIII	How to improve the utilization of engineering manpower —Summary and recommendations
Suggested Readings on Utilization	

WOULD you like to know how 500 of America's leading industrial firms are solving their engineer shortage problems? Whether you are employer or employee, you can't fail to learn much from this NEW book about a problem that has concerned the Nation's leading industrial minds. *How to Improve the Utilization of Engineering Manpower* is a 56-page study of industrial firms and engineering organizations employing some 106,000 engineers and a total of 2,750,000 persons. It is the second in a series of Research Reports based on Executive Research Surveys conducted by the National Society of Professional Engineers, through its Professional Engineers Conference Board for Industry. The first report was entitled, *How to Improve Engineering-Management Communications.*

How to Improve the Utilization of Engineering Manpower is a guide book and manual for the executive in companies and organizations employing engineers and engineering services. For the engineer . . the student engineer . . . the engineering educator, it is an appraisal and textbook of the values of better utilization.

In these times when management and engineers alike are striving to bring the vital contributions of engineering to maximum effectiveness in industry, research, government and national defense, this report on *How to Improve the Utilization of Engineering Manpower* is one of the most important contributions yet made to management's *working* bookshelf.

WHAT OTHERS SAY . . .

". . . an excellent job has been done in compiling the data and in the writing of this book."
C. Davis Blackwelder,
Vice President, Reynolds Metals Company

". . . the report is very well done."
John Forslew,
Chief Engineer, The Carnation Company

"In reading this report I see ideas which we can employ to advantage in our company."
A. C. Neff, Vice President,
Armco Drainage & Metal Products, Inc.

"The report is an important step in improving the relationships between management and engineers . . ."
Charles E. Lawall,
Ass't. Vice President, C&O Railway Co.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
1121 Fifteenth Street, N.W., Washington 5, D. C.

Please send me ..... copies of HOW TO IMPROVE THE UTILIZATION OF ENGINEERING MANPOWER at $..... per copy.

Please send me ..... copies of the first NSPE report, HOW TO IMPROVE ENGINEERING-MANAGEMENT COMMUNICATIONS, at $..... per copy.

I enclose (....money order) (...check) in the amount of $.....

NAME .....

STREET .....

CITY .....STATE .....

Order Your Copies Today

PRICES:

- For NSPE members—$1 per copy, up to 25 copies
- For non-members—$2 per copy, up to 25 copies

Prices for quantities over 25 copies will be quoted on request.

Case and Pratt Institutes Join Efforts with Industrial Firms

INDUSTRY-EDUCATION TEAMWORK

In order to provide engineering students with practical as well as theoretical training and make them acquainted at first hand with applied industrial techniques, and also to bring about the more efficient use of the results of on-campus engineering research, many schools and industrial concerns have been working out joint arrangements which unite their best efforts for these purposes.

Two such interesting industry-education working agreements have recently come to the attention of your AMERICAN ENGINEER. They involve different approaches to the situation, but each in its own way will undoubtedly help to expand the horizons of the engineering students concerned, in addition to proving mutually beneficial for the schools and companies taking part.

The first of these innovations is an unusual motor design course which has just been inaugurated at the Case Institute of Technology in Cleveland with the start of the new semester in February. Normally such design courses are limited to mere "paper work" that cannot be checked by actual tests for performance and manufacturing practicability, but at Case the student engineers will now be able to have their own design efforts incorporated into manufactured motors.

Under the new plan, small groups of students will work together in designing motors from one to 7.5 horsepower. Their specifications will then be sent to Springfield, Ohio, to the main plant of Robbins & Myers, Inc., a 75-year-old electrical manufacturing company, where the motors will be built at no charge. The company will then deliver the motors to Case where the students may check their work by making actual tests that are rarely possible in ordinary classroom procedure. The motors will become the property of Case Institute as an adjunct to regular laboratory equipment.

Before setting up the course, Case staff members, including Dr. Paul Hoover, head of the Electrical Engineering Department, carefully reviewed the design techniques used in the Robbins & Myers engineering department. Mr. A. E. Hartman, instructor for the new class, spent several months working with Robbins & Myers engineers in order to adapt the strictly industrial design processes for classroom instruction.

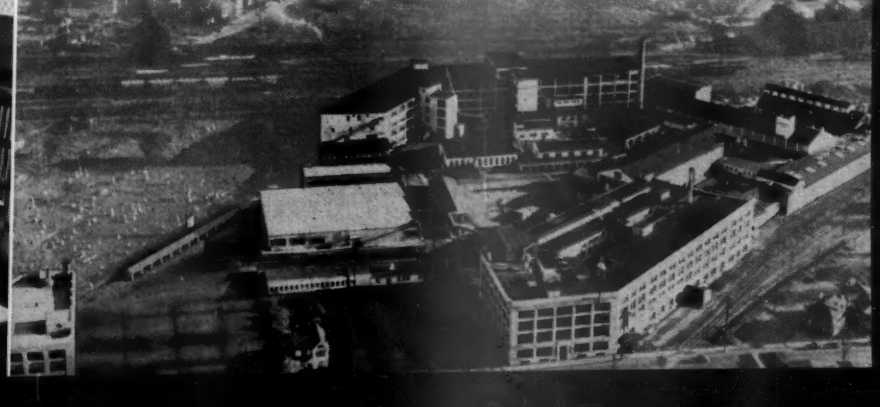
Case officials emphasize that the resulting material will in no sense add up to what might be called a "trade course," since fundamental design theory will not be sacrified. Work, however, will be calculated around present Robbins & Myers motor laminations in order that student-conceived designs may be built with existing company production tooling as far as possible.

The second industry-education agreement is a working partnership that has been formed by Charles Engelhard, Inc., Newark, New Jersey, manufacturers of industrial instruments, and the Pratt Institute, a Brooklyn technical college. Under a grant made by the Newark firm, research in the design and development of industrial instruments will be carried out at Pratt Institute by faculty members and students.

Major problem to be studied in behalf of the Newark firm is the design of flow meters, instruments which measure the quantity of fluid passing through a pipe. Special emphasis will be given to the "calorific" flow meter, in which the metering principle is the rate at which the fluid cools a heated pipe wall. The principle can be applied particularly well to the design of flow meters for the measurement of corrosive and toxic fluids, and the aim of the long-range program is to make possible the building of highly dependable instruments that can measure all fluids regardless of differences in viscosity, chemical properties and thermal conductivity.

Since the program will encounter problems in a number of distinct fields, including chemical engineering, electronics, and servo-mechanisms, Pratt Institute will provide diverse laboratory facilities and scientific personnel. Professors and students of chemical and mechanical engineering, physics, and mathematics will be called upon as needed. Professor Richard Shaffer, Chairman of the Department of Chemical Engineering, will direct the program at Pratt, while E. P. Anderson, manager of Charles Engelhard, Inc., will act as coordinator.

Commenting on the joint arrangement, Dr. J. H. Laub, executive vice-president of the Newark company, who announced the program jointly with President Charles Pratt of the Institute, said: "Such industry-education teamwork should bring substantial benefits to both sides. In these days of shortages of technical personnel, it enables industrial firms to draw on a reservoir of scientific and professional skills that would not otherwise be available to them. It also gives university students the invaluable experience of taking an active part in the pioneering of new industrial developments, rather than being restricted to work on purely academic problems."—*End.*



Below left: Discussing the Pratt Institute-Charles Engelhard, Inc., agreement are, left to right: Professor Richard Shaffer, Dr. J. H. Laub, Professor Herman Krinsky, and Mr. E. P. Anderson. At right: Motors designed by Case Institute of Technology engineering students will be built at the Springfield, Ohio, plant of Robbins & Myers, Inc., so that students may make practical tests of their work and thereby learn by seeing and doing.

The South Brings Its Building Codes Up-to-Date

By Soulé Butler, P. E.
President, Southern Building Code Congress

THE evolution of building construction in the South has brought about an increasing demand for building code modernization. The Southern Building Code Congress* has undertaken to supply this regional demand by promulgating a regional building code. The Southern Standard Building Code, composite of the efforts of men in the various professions concerned with building and representative of all parts of the region, is based on the theory that the much needed code simplification, demanded by building officials can be better realized by confining codification efforts to a region of uniform problems and habits.

The variation in snow load throughout the United States is often pointed to as an example of the inconsistency of building design requirements. This is clearly demonstrated in figures 1 and 2 shown in the spring edition of the 1952 Housing and Home Finance Agency quarterly publication. Frost action, wind loads, and stresses created by earth tremors and termite protection are also factors of regional nature.

Changes in building concepts have been more drastic in the South, perhaps, than in any other part of the nation, and it is this change that is in great measure responsible for the need for established standards. The development of new materials, such as insulation, and the provision for more adequate facilities, such as central heating and air conditioning have affected building design all over the country. So, too, has the size of the American family and the new—or, to be more accurate, the rediscovered concept of functional building.

There remain, however, needs that are specific for the region, where warm weather prevails much of the year, where winters are mild and almost any season is oft times apt to be quite damp. The new materials can be used to advantage in all sections of the country. How they are used and adapted in the South is the field for which the code is designed.

The functional approach made by the Southern Building Code Congress has resulted in more liberal allowances for height and area and eliminated many of the non-functional requirements imposed by some of the present day codes. Loading requirements have been adopted to meet actual occupancy requirements and maximum wind and snow loading common to the Southern area. Many of the requirements which would result only in the reduction of fire insurance premium have been eliminated; however, the code does not prohibit the builder from providing these features if he finds them economically justified.

The problem of code adoptions becomes simpler when approached on a regional basis. It is easier to sell the idea to responsible public officials. The pride of regional ownership serves as a stimulant in the public relations program necessary to popularize a code and neutralize latent public resistance to regulation.

The elimination from the code of requirements which have no connection with local conditions further reduces the nuisance value of the shyster builders, who diligently ferret out any such useless sections for use in their continuous program to discredit code requirements and circumvent local regulations which prevent them from securing unearned profits.

IF a building code is to produce the maximum possible community benefits, it must not only insure ample fire and structural safety, but must also insure any future owner that the building meets a known minimum standard requirement. It is at this point that enforcement becomes essential and the advantages of a regional code become more evident. Once a code is adopted, a continuing program of educating building officials and building inspectors to handle the enforcement problems and the interpretation of code requirements is essential. A continuing public relations program, in this as in any other public or private undertaking, is an essential aid to enforcement. Every effort must be made to eliminate local opposition. The American people have inherited a resentment to regimentation. This is evidenced by the manner in which our government is organized, with various political subdivisions forming the closest link with the people governed.

The regional code idea is a step in the direction of bringing code revisions closer to the people interested, and further break-downs are made through the adoption procedure of most municipalities which consists of adoption of a basic code by reference and then providing amendments to meet any unusual local condition not provided for in the basic code.

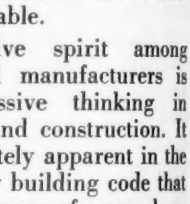
A continuing code revision program is being carried out by the Southern Building Code Congress under the supervision of competent engineers, architects and building officials. Revisions to the basic code are made only after they are approved by a majority of the member cities. Each member is then free to adopt or reject any or all of the approved revisions as well as make revisions of his own when found desirable.

The competitive spirit among building material manufacturers is speeding progressive thinking in building design and construction. It becomes immediately apparent in the application of any building code that an intensified program of research on testing methods and standardization would be highly beneficial. Since the new materials can be adapted for use in every part of the country, their specifications should be reported in terms that carry the same significance in every part of the country. With standard specifications to work from, the building official need only concern himself with the end result of the product use, in terms of the functional requirements of his region, which are readily available through the regional code.—***End.***

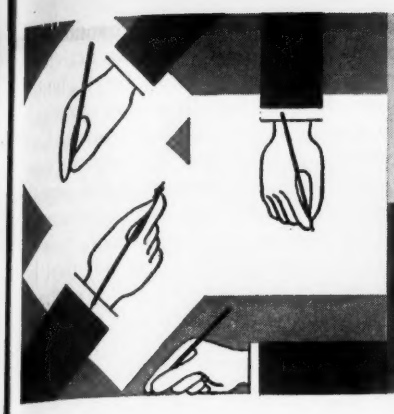
---

* **The Southern Building Code Congress maintains an office in the Brown-Marx Building, Birmingham, Alabama, under the supervision of Mr. M. L. Clement, Executive Director. Mr. Clement edits the *Southern Building* magazine, the official publication of the Southern Building Code Congress and the Gulf States Regional Council, American Institute of Architects. One of the features of this magazine is the code interpretations made by Mr. Clements for the building officials using the Southern Standard Building Code. The popularity of the Code has resulted in over 400 adoptions and the Director is continually receiving inquiries from municipalities with building regulation problems.**

The Author . . .



Soulé Butler, a member-at-large of NSPE, is president of the Southern Building Code Congress. City Engineer of Alexandria, La., he has had an active career in construction work, flood control, and municipal planning. He is active in many community and professional organizations.



Professional POSTSCRIPTS

Welcome back! It's good to get together again and review some of the items that professional engineers from everywhere are sending in to —PP—. Then, too, we publish from time to time material from those *outside* the profession — we think this helps to maintain a proper perspective. Incidentally, how about hearing from you?

First out of the mailbag this month is a piece on salaries. This is always an interesting subject so let's hear now from Engineer William Crepea, NSPE member of Brooklyn, N. Y.

—PP—

I HAVE read with great interest the letters that appeared in the AMERICAN ENGINEER of August, September and November issues regarding inadequate salaries for engineers and architects.

The issue of low compensation has plagued the engineering profession for many years. Too much has been said and some improvements have been made for the last three years in the solution of the above problem, but the sting is still there.

As one of many engineers and architects who feel abused because of their low pay, and as one whose professional outlook and economic standing is affected by the retarded action of our society. I am writing this letter to register my dissatisfaction against our so-called "professional complacency" in pushing the cause of the professional engineer.

Looking back about 20 years, there was talk of a possibility of engineers joining a Labor Union in order to get better recognition. I was one who abhorred such a move. My contention was that if an engineer has determination and a desire to succeed, he cannot possibly affiliate himself with a labor union. But I asked myself, "Is there any other method or formula by which salaried engineers and architects could secure for themselves better recognition and advancement in salary?" My answer was "Yes." The salvation of the engineer must come from, or through a strong engineers' society independent of any labor help or be submerged.

Someone slipped a circular into my hands from the New York State Society of Professional Engineers, some objectives of which read as follows:

(1) To guard the Public and the profession against the unlawful practice of engineering and prevent the use of the term "Engineer" by unauthorized persons, by promoting strict enforcement of the licensing law for professional Engineers.

(2) To work for the appointment of representative qualified engineers to public boards, and commissions where functions include engineering matters.

(3) To establish standards of equitable compensation for engineering services.

(4) To increase the dignity and economic welfare of the Professional Engineers.

These objectives sounded great to me. I hailed the birth of this organization with the hope that it will symbolize the strength of the engineering professional socially, morally and economically, as it professed to be.

In 1935, I joined the Kings County Chapter. I always paid my dues in advance, attended meetings, served in committees, enjoyed their collations, and made some new acquaintances. As time marched on, with my salary in City Service remaining stationary for many years, I began to feel the impact and disgrace of being a low-salaried engineer, but I was happy that I joined the society because I was sure that eventually the society will become strong and will be the pride of the salaried engineer.

Regarding the first objective, I think the society has done a fine job. In enforcing the licensing law for engineers it has lifted the profession out of its old rut—the "Political Patronage" which flooded and besmirched the engineering profession for many years, so that the public thought very low of a profession that permitted such things. The licensing of engineers and architects will eventually restrict the practice of engineering to licensed professional engineers worthy of the name, and will be protected by law. This will enable our profession to give the highest type of service to the people, but we must first eliminate the "underprivileged" status of the engineer. We must raise his standard of living in order to place him on a par with the medical and legal professions.

As to objectives three and four, I think the society has failed us. It is not so much the professional status that is perturbing the engineer employee, but rather his economic status. Although the two are inter-connected, the professional engineer feels that he had to put in four years of High School, four to five years of college training; and, backed by many years of experience, he should not be forced to sacrifice the welfare of his family because of low salary. How much production, and what kind of production can you get out of an engineer who is being nagged at home by his wife who has to go to work and neglect her children because her husband, the civil or mechanical engineer, does not earn enough, particularly now with the high cost of living and very high cost of taxation, with a diminished purchasing power of the dollar?

The Professional Engineer and Architect cannot have much faith, nor can he owe his solemn obligation to a profession that does not pay him a living wage. Is there any wonder why the morale of many engineers has fallen? Why there is such a strong stagnation of spirit among many engineers? Plainly, this is because of our policy of keeping aloof from the economic life of the engineer. Efficient production cannot be attained unless the engineer is pulled out from under the chains of necessity which is largely economic. The ambition of many engineers in industry, in City Service and elsewhere has been crushed. The good-will and spirit of many engineers are buried by indifferent supervisors. The old biblical principle of "Do unto others as you would others do unto you" does not exist.

In 1948, a campaign started to establish modern rates of pay for the New York City technical employees. A joint committee on Engineers and Architects Salaries was formed, which consisted of representatives from many engineering organizations including the five New York City chapters of the New York State SPE. Thanks to the efforts of the above

committee, the majority of the engineers in New York City service obtained reasonable raises in salary, but they find that their salaries are still inconsistent with the professional services rendered. The salaries of many engineers are still less than the skilled mechanics whose work they supervise. This leaves a gap which still has to be closed and the goal remains incomplete.

The old talk of service to the public must work both ways. The general public has only a vague conception of what they owe to the engineering profession for their material welfare, sanitary improvements, advanced housing, transportation, radio and television, etc. They will continue in ignorance unless we talk to them through the press. The engineer will never be recognized by the public unless he becomes a permanently well paid professional man.

A time must come when this problem can be aired for solution; the time is now. All licensed Professional Engineers should join the Society. Make the National Society of Professional Engineers as much a power in the engineering field as the American Bar Association and the American Medical Association occupy in their respective fields. Our Society can and will be a power, if our job is to cultivate a fraternal spirit, and a heart that will throb with human emotions, a heart that will be sympathetic to all engineers who need a helping hand.

The society has long passed its infantile strength and size. It is now capable of exerting its great influence on management to check into the economics of its members. The National Society should concentrate on steps to be taken to aid the professional engineers. Schedules of recommended salaries have no meaning unless a way is found to enforce them.

In conclusion I wish to add that, after 35 years of service with the City of New York, I am convinced that the engineer needs the stimulation of a better economic life in order to better develop his inventive, creative and productive talents; and now on my retirement age, I am full of hope that with the aid of the Society the engineers and architects will be put on a financial level that will enable them to face society with a smile.

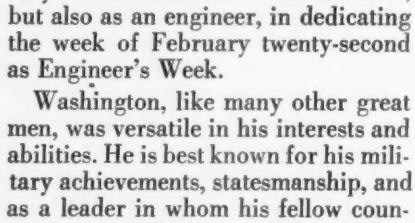
—PP—

While Engineers' Week is still fresh in our minds, we thought you'd enjoy a very fine essay about it written by Engineer Carl M. Gilt, 1st Vice President of the NYSSPE, and a past National Director. Here is Engineer Gilt's work:

—PP—

FEBRUARY is unique, not only because it is the shortest month of the year, but also because in it the American people pay homage to two of their greatest statesmen in celebrating the anniversaries of their births. Following the lead of New York State, the National and various State Societies of Professional Engineers pay particular tribute to George Washington, not only for his better known attainments, but also as an engineer, in dedicating the week of February twenty-second as Engineer's Week.

Washington, like many other great men, was versatile in his interests and abilities. He is best known for his military achievements, statesmanship, and as a leader in whom his fellow countrymen placed their confidence. His ideas and precepts were influential in molding the formation of the new American government with its new conceptions of individual liberties and responsibilities. They have been guiding principles in development of the nation to its present stage of prestige, power and wealth. He was a successful planter, planning and supervising



(EDITOR'S NOTE: *All those desiring to list their meetings under Dates to Remember should send* COMPLETE *information, including date and place, directly to the American Engineer.*)

Ohio Society of Professional Engineers—75th Annual Convention, March 5, 6, 7. Neil House, Columbus, Ohio.

NSPE State Presidents' Conference—March 13, 14. Brown Hotel, Louisville, Kentucky.

Kansas Society of Professional Engineers—Annual Meeting, March 20, 21. Allis Hotel, Wichita, Kansas.

New Jersey Society of Professional Engineers—Annual Meeting, April 17, 18. Essex House, Newark, New Jersey.

Michigan Society of Professional Engineers—Annual Meeting, April 17, 18. Bancroft Hotel, Saginaw, Michigan.

New York State Society of Professional Engineers — Annual Meeting, April 23, 24, 25. Hotel New Yorker, New York, New York.

Massachusetts Society of Professional Engineers — Annual Meeting, May 9. Hotel Kenmore, Boston, Massachusetts.

Pennsylvania Society of Professional Engineers — Annual Meeting, May 15. Harris Hotel, Harrisburg, Pennsylvania.

Rhode Island Society of Professional Engineers — Annual Meeting, May 19. Rhode Island Yacht Club, Providence, Rhode Island.

in detail the planting and handling of crops and all the various activities necessary in operating a large plantation which, at that time, was practically a complete, self-sufficient unit. Carpenters, masons and blacksmiths connected with the plantation did practically all the building and maintenance of structures and equipment. School histories frequently point out that he worked as a surveyor, but it is perhaps less well known that he was a civil engineer, laying out and building roads and bridges. As a military engineer he made detailed plans for the location and design of military forts, accompanied by instructions for their construction. With his knowledge and ingenuity he made use of the materials and forces available to design and build structures and tools, which, of course is the basis of engineering.

When one looks back at the industrial state of America at the time of Washington, one is struck by the tremendous strides made in the less than two centuries that have followed. At his time, practically all physical work was done by manpower, supplemented to some extent by horses and oxen. Practically everyone worked from dawn to darkness six days a week and sometimes seven, for the bare necessities of life. The forty hour week was unheard of and impossible. Indentured servants and artisans and slaves were common. The principal occupation was farming with planting, cultivating and harvesting all done by hand. Metal working was done in hand operated furnaces, foundries and forges. The use of wind power and water power for pumping water and grinding grain goes back into antiquity but was limited to small undertakings at very favorable locations.

The invention of the steam engine by a contemporary of Washington, James Watt, opened the door to the phenomenal modern industrial development which has served to reduce the drudgery of labor and provide the material things which have added so much to our physical well-being and comfort. It provided power when and where required that would accomplish many times the work that a man could do with his own hands. The average modern American factory worker has for his use about 8 horsepower and, to put it another way, can turn out about 80 times the work that he could do with his hands in an eight hour day. Instead of each worker's providing his own tools, valued at most at a few hundred dollars, the factory now provides the plant and tools which cost many thousands of dollars per employee.

This tremendous increase in output

per person has made it possible for only a portion of our population to produce all our basic needs for food, clothing and shelter, leaving others free to supply our wants for conveniences and luxuries, for enjoyment and entertainment and the development of the arts and sciences.

The United States has led the world in this remarkable development. With only about 7% of the world's population, the United States uses nearly half of the world's production of electricity, which is a pretty good measure of the substitution of mechanical power for man power and the production of goods. The use of electricity in this country has doubled about every ten years for the past several decades and bids fair to continue to increase at a rapid rate in the foreseeable future.

What are the reasons for this outstanding development of this country? One immediately thinks of its vast natural resources as a contributing factor. Also there is a large population providing a wide market without the artificial trade barriers of customs or legal restrictions or the natural economic impediments of heavy transportation costs over great distances. Such a market makes large scale, machine production economical and leads to keen competition. Perhaps most important of all is the spur of competition, the incentive to continued efforts to reduce costs, or to supply something new or better. To the wisdom of Washington and his contemporaries must be given credit for encouraging this spirit when they formulated a government designed to protect the individual liberties and responsibilities of its citizens, the right of any man to take any job he wants within his capabilities and to keep what he earns for himself and his family.

The engineer has played an essential role in all this development. Together with the scientist he has learned more about materials and forces and made new materials; he has combined forces and materials in new ways to make new things. He is an essential part of industry that supplies all the various devices that go to make our present day "Standard of Living." Engineering has vastly increased in importance and complexity since the days of Washington and is now recognized as a "profession." Many problems have been solved but each solution opens new problems that present an ever increasing challenge to the knowledge, ingenuity and wisdom of engineers and scientists.

—PP—

Here's a short item from a briskly written news letter called the "Arizona Progress." It's about something that has a lot of truths and untruths written about it—public relations. What is (or are) public relations? Here, try this and see.

—PP—

ONE of the new "wonder drugs" currently in great demand is a magic cure-all known as Public Relations. As we rather dimly understand the term, public relations is (or are) good for what ails you—whether anything does or not. You may be doing all right but the chances are you are doing it wrong—like the awkward golfer who nevertheless manages to break par.

Basically, the PR formula is a simple one: either do what people like—or make them like what you do. The main thing is to smile, smile, smile, prolifically and perpetually, despite pain or provocation. Most PR smiles fall into these classifications: (1) the ingratiating grin, (2) the self-conscious smirk, (3) the gruesome grimace, (4) the labored leer, (5) the fluttery fawn, (6) the girlish giggle, (7) the booming bellow, (8) the flashing fangs. When properly conditioned, you will spend most of your time thanking people for doing things they get well paid for doing anyway—or thanking them for thanking you for the same thing. This can go on indefinitely—and does.

Winning and keeping friends is no longer a casual matter of nature taking its course. You must work at it, hard and steady, or hire it done. Everything, from politics to love-making, now calls for a carefully planned public relations "campaign." Even public relations firms employ public relations experts to help them become more glamorous than other public relations firms.

Of course, there is more to public relations than gimmicks and grinning—although this may be news to some of the medicine men now at large. What you are selling must be worth selling, including yourself. The temptation is always great not only to gild the lily but to try to deodorize the skunk. Building up incompetents and whitewashing scoundrels are perversions of the public relations concept. Public relations, in our book, is the Golden Rule with a sense of humor—and a sense of responsibility. It should start with some honest soul-searching and develop into a relationship of mutual trust. Quacks and glib promoters should be encouraged to employ their talents elsewhere.

—PP—

We'll see you in April when we hope you'll have your fishing tackle ready for the season ahead, and that winter snows will be long forgotten. Unless, of course, you are spending the winter in Florida—in this case we'll finish off while turning slowly green with envy.

Letters

(*Continued from page* 5)

who are members of The National Society of Professional Engineers and the member state societies. It behooves all members of the society to do a personal selling job on the registered Professional Engineers who are not members. Their support is necessary for their own recognition and advancement as well as that of the society.

2. There is a shortage of engineers—who are registered. Many men on industrial payrolls have the training and experience necessary for registration and are actually practicing engineering. In a legal sense these men may not be engineers. They contend that the nature of their work is such that registration is not required for their position. Hence, again, it is necessary for all registered Professional Engineers, including members of the society, to do missionary work and sell the idea of registration to all who meet the requirements.

3. There is a shortage of engineers—who are content to work as draftsmen and clerks. Industry realizes that the graduate engineer does a good job on a drafting board or in a clerical position. The sad part is that they are getting such men at a cheaper rate than they would have to pay the product of a business school or, in some instances, even high school graduates used as common labor.

4. There is a shortage of engineers—who are content with doing a good job for poor pay and no recognition. In some industries, top brass is sold on the glitter of a project by a very zealous subordinate. The engineer is then given the project. If the engineer is successful in developing it, the subordinate receives full recognition; if the project is impossible, the engineer incurs the wrath and contempt of the subordinate and top brass. One can't win for losing under such conditions. In some industries, top brass tolerates the presence of engineers for routine duties but does not consider them for planning, nor pay any heed to the recommendations of engineers. When unusual conditions arise, outside consultants are retained. These consultants, after a thorough investigation which includes conferences with regular engineering personnel, make recommendations which are accepted. Frequently the recommendation is the same as previously made by the regular employee engineer. It isn't a case of the engineer failing to sell his idea; top management just has not opened its eyes to the fact that the engineer is due proper respect and is eager to perform his duties.

5. There is a shortage of engineers—who are satisfied with the remuneration given by industry in general. The young graduate

(*Continued on page* 39)

With Our Members . . .

A Backward Glance

Engineers' Week Observance Was Marked By Many Outstanding Community Events

From coast to coast this year the National Engineers' Week Celebration was highlighted by many successful programs sponsored by chapters and State societies.

The Professional Engineers of Colorado held their Annual Banquet at Denver's Park Hill Country Club on February 27 as a climax for the observance in that state.

From California come reports of a special Engineers' Week issue of the Pasadena Chapter's monthly bulletin; a varied local program, including movies, window displays, and radio and TV shows, sponsored by the East Bay Chapter; and a display at the San Jose State College featuring models of Leonardo Da Vinci's engineering creations, timed to coincide with the San Jose Chapter's celebration.

Another particularly interesting student observance was that organized by the St. Patrick's Council of the Georgia Institute of Technology in cooperation with the Georgia SPE. Students from each Georgia Tech department arranged displays representative of their respective engineering fields in competition for a trophy for the most outstanding exhibit. In addition, each GSPE chapter was invited to send five outstanding high school seniors interested in engineering to Georgia Tech for the celebration.

The Monmouth-Ocean chapter of the New Jersey Society also planned to turn student attention to engineering as a career by offering the services of its members to consult with interested students in all high schools in the area.

In Ohio, the coming OSPE Diamond Jubilee Celebration, March 5, 6, and 7 in Columbus, will climax a two-week observance dating from the Engineers' Week kick-off. There were special programs for the week in each Ohio chapter. A feature of the Akron observance was the presentation over a local radio station of the NSPE script, *A Leap in the Dark,* by twelve members of the Toastmasters Club; and in Toledo, the local P.E.'s joined with the Toledo Technical Council in an extensive celebration. The University of Toledo also scheduled an Open House for prospective engineering students.

As your March AMERICAN ENGINEER goes to press many other stories of outstanding Engineers' Week activities are still pouring in, indicating increased interest in the engineer and his profession in communities throughout the country and pointing up the continued success of this annual event.

Seventeenth TSPE Meeting Held In Amarillo

The Herring Hotel in Amarillo, Texas, was the scene of the Seventeenth Annual Texas SPE Meeting late in January. An interesting professional and social schedule was provided for the engineers and their wives who attended.

Local and State officials as well as prominent engineers participated in various phases of the program. Mayor Gene Klein of Amarillo delivered a welcoming address to the assembled P.E.'s. NSPE President John D. Coleman was among the principal speakers, as were Texas Attorney General John Ben Shepperd, Oklahoma SPE Past President Gerald W. McCullough, Arthur A. Smith, vice president of the First National Bank of Dallas, and D. B. Quarles, national president of the American Institute of Electrical Engineers.

NSPE Members Among Kentucky SPE Officers

While the Kentucky Society of Professional Engineers is not affiliated with the National Society at this time, two of its officers elected and serving for the 1953 term are NSPE members. They are the Society's President, Allen A. Ball, and the Second Vice President, Henry W. Phillips.

As part of its current program, the Kentucky Society is studying the question of affiliation with NSPE to help with the national movement to attain unity of professional standards throughout the country.

Banking Discussed at Delaware Meeting

Delaware P.E.'s at a recent meeting in Wilmington heard John Butler Jessup, president of the Equitable Security Trust Company, speak on *Modern Banking Services Available in Wilmington.* Following the lecture, Edwin P. Neilan, executive vice president, and William J. Taggart, assistant vice president, also with the Equitable Security Trust Company, joined Mr. Jessup in answering questions from the floor on banking and trust matters.

Chamber Of Commerce Talk In Houston

Members of the San Jacinto Chapter of the Texas SPE recently heard Marvin Hurley, executive vice president and general manager of the Houston Chamber of Commerce, discuss *Development Trends in Houston and the Gulf Coast Area.* The meeting was held in the Physics Amphitheatre on the Rice Institute campus.

Engineer Shortage Is Lecture Topic At NYSSPE Winter Meeting

Many concrete and practical steps to combat the critical shortage of engineers were taken during 1952, William H. Larkin, chairman of the Board of Examiners of Professional Engineers and Land Surveyors for the State of New York, told members of the NYSSPE Board of Directors in an address at their regular winter meeting held in the Hendrick Hudson Hotel in Troy, New York.

Emphasizing the need for better utilization of engineering talents, Mr. Larkin directed attention to the great number of studies and reports on the subject published during 1952 and applauded the increasing awareness of all segments of the profession that effective programs must be speedily developed. Particular interest must be taken, he pointed out, to the utilization of engineers by the armed services where careful placement is essential to help alleviate the over-all shortage.

"In this technological age," Mr. Larkin said, "a continued shortage of professionally trained engineers can present a vital threat to the security, both military and economic, of this nation. To forestall it, all groups concerned — government, industry, the schools, and the community—must cooperate in putting these practical recommendations [for better utilization] into effect."

Monmouth-Ocean Chapter Hears Lecture

The February meeting of the Monmouth-Ocean Chapter of the New Jersey SPE featured complementary lectures by Norman Nisenoff and Frank Priebe of Fort Monmouth. The subject of their presentation was *Giant Brains*, the story of the development of electronic computing machines.

Pennsylvania Regional Meeting Held

A regional meeting of the Pennsylvania SPE was held early in February at the Armstrong Cork Company Auditorium in Lancaster. The Lincoln Chapter was host for the event, which was attended by 160 engineers.

Speakers included Ezra K. Nicholson, president of the Pennsylvania Society; John T. West, Jr., PSPE secretary; and Paul H. Robbins, NSPE executive director.

Forty-Third Annual Meeting Held In Idaho

The Idaho Society of Professional Engineers recently held its forty-third annual meeting in Boise. A highlight of the business session was the election of new officers, including: Jay Painter, President; G. A. Riedesel, Vice-President; W. P. Eaton, Secretary; and S. M. Barton, Treasurer. At the same time L. M. Huggins was elected National Director.

Another feature of the convention was a panel discussion on the question, *What Should Be the Basis for an Equitable Distribution of Highway Funds?*

NSPE President John D. Coleman attended the meeting and was guest speaker at the annual banquet and dance.

Civic Plans

Minnesota Society Swings Into Action; Sponsors Vigorous Legislative Program

Under the leadership of Engineer Ted Waldor of the Capitol Chapter, chairman of the Legislative Committee, the Minnesota Society of Professional Engineers is embarked on a busy legislative program for 1953.

The Society is planning to sponsor legislation for the revision of the fee structure for county surveyors. The Board of Directors has also authorized its backing of legislation that will make possible the upward revision of the salaries of engineers employed by the State if such action becomes necessary and desirable.

In addition, the Society will actively support eleven other legislative proposals. Included in the list is legislation for the continuance of appropriations for topographic mapping, for the establishment of a four-year tenure for county engineers, and for the construction of a highway department experimental building, as well for other action of direct or indirect interest to P. E.'s.

Engineer's Role In City Government Discussed

John F. Lucy, Schenectady city engineer, was the speaker at a recent meeting of the Schenectady Chapter, NYSSPE. He outlined the *Role of the Engineer in City Government*, and his talk was followed by a general discussion among the members present.

LaGrange, Georgia Is Lecture Scene

Unity in Engineering was the subject of a lecture given before the members of the Central Chapter of the Georgia SPE, meeting at the Colonial Hotel in LaGrange. The speaker was J. W. Lovell, vice-president of the State Society.

Tenth Annual Meeting In Wisconsin

Reports out of Milwaukee indicate that the Tenth Annual Meeting of the Wisconsin Society, held at the Schroeder Hotel recently, was a most successful one.

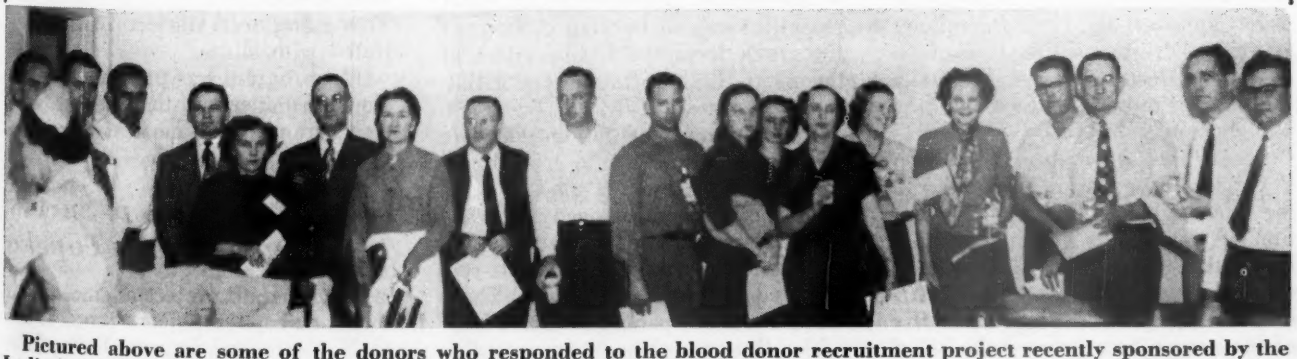
A well-balanced program was offered to the members in attendance. Speakers included: Frank P. Zeidler, Mayor of Milwaukee, who delivered the welcoming address; George A. Sievers, president of the Industrial Engineering Institute; Murl Deusing, curator of education with the Milwaukee Public Museum; Robert Garnier, classification examiner of the City of Milwaukee; and Carl Taylor, president of the Waukesha State Bank.

A special ladies' program was also arranged for the event.

Civil Defense Call In Westchester County

Members of the Westchester County Chapter of the New York State SPE are being urged to sign up for an active part in the county Civil Defense set-up. Problems dealing with public works, public utilities, rescue, and shelter work have been assigned to the Engineering Services section of the county's CD organization.

Engineers' Day at Oklahoma Defense Blood Center



Pictured above are some of the donors who responded to the blood donor recruitment project recently sponsored by the Ladies' Auxiliary to the Central Oklahoma Chapter, Oklahoma SPE. Considered an outstanding success, it was the first official "Engineers' Day" at the Defense Blood Center in Oklahoma City. Mrs. Harold L. Pickens, appearing fifth from the left in the line-up of donors, is president of the sponsoring auxiliary. Hostesses at the center for the day were: Mrs. Mark Hargis, Mrs. Gomer Bittle, Mrs. J. Roy Black, Mrs. L. M. Limpus, Mrs. H. C. Denison, and Mrs. Maurice Myers. Consideration is now being given to making the project an annual affair.

At Beckley, W. Va., Meeting

Participants in the Appalachian Chapter's recent installation ceremony are pictured above. In the foreground, left to right, are: J. P. Hindsley, President; William Maratta, Director; Lloyd G. Fitzgerald, Secretary-Treasurer; and J. E. Howard, Director. In the second row are: Paul R. Maxey, Director; John C. Morton, Second Vice President; C. C. Darragh, outgoing President; and B. B. Crocker, First Vice President.

Honors in West Virginia

Appalachian Chapter Wins Citation; Members Enjoy Banquet and Lecture

President O. S. Swanson of the West Virginia SPE presented the Society's trophy for the State's most outstanding chapter to the Appalachian Chapter at a banquet held recently in the El Chico Restaurant in Beckley. Last year the award went to the Wheeling Chapter. Any chapter that wins the honor for three consecutive years will be permitted to keep the trophy permanently.

Ninety persons attended the banquet to which the engineers' wives were also invited. Another highlight of the evening was the installation of new chapter officers by outgoing president C. C. Darrah. They are J. P. Hindsley, President; B. B. Crocker, First Vice President; John C. Morton, Second Vice President; and Lloyd G. Fitzgerald, Secretary-Treasurer. William Marrata, Paul R. Maxey, and J. E. Howard are Chapter Directors, and A. S. Cappellari and C. C. Darrah are *ex officio* Directors. Leslie C. Gates is National Director to the NSPE, while Waldo S. Lafon is Director to the State Society.

Speaker of the evening was John B. Graaf, an application engineer with the Westinghouse Electric Corporation's Aviation Gas Turbine Division in South Philadelphia. The topic he selected for his address was *Jet Aircraft Engines,* and during the course of his lecture he expressed the belief that American jet planes now in action over Korea are "the fastest, toughest, and most dependable aircraft ever built."

Korea's P.E.-Sponsored Operation Christmas Reported A Huge Success

"Operation Christmas" for the needy children and adults of Pusan, Korea, that received its initial impetus from NSPE member Lt. Col. George A. Bachman of Reading, Pa., was reported a huge success in a full report recently received by your AMERICAN ENGINEER from the headquarters of the 296th Transportation Truck Battalion, commanded by Col. Bachman.

The clothing contributions that were received in response to Col. Bachman's plea were distributed to a gigantic assemblage of needy Koreans on Christmas Day. The Battalion report states that the contributions represented 37 States and Hawaii. There were over 2,000 packages received, for which the postage costs amounted to almost $6,000. Many NSPE chapters throughout the country had joined in this endeavor at Col. Bachman's request.

Machine Tool Lecture In Springfield, Ohio

Richard Montanus of the Springfield Machine Tool Company was the guest speaker at the February 18 meeting of the Springfield Chapter of the Ohio SPE. Following Mr. Montanus' talk, chapter members and their guests proceeded from the Rustic Inn where the meeting was held to the tool company plant to observe the work in progress.

San Mateo D.A. Addresses Peninsula Chapter

Louis M. Dematteis, San Mateo County District Attorney, was the featured lecturer at the regular February meeting of the Peninsula Chapter of the California Society of Professional Engineers. Mr. Dematteis told the members and their guests about the narcotics problem in the area and measures that are being followed to wipe it out.

Sales Lecture In Hartford, Conn.

Vincent J. Loscalzo, with the Apparatus Department of the General Electric Company, spoke on *The Art of Effective Presentation* before a recent meeting of the Hartford County Chapter of the Connecticut SPE. His address was preceded by a social hour and dinner for members and their guests.

Industrial Research Is Columbus Topic

At a recent meeting members of the Franklin County Chapter of the Ohio SPE, held at the Central YMCA Auditorium in Columbus, welcomed Edward R. Dye as guest speaker. Mr. Dye, who is head of the Industrial Division of the Cornell Aeronautical Laboratory, chose as his subject *Industrial Research—A Challenge to the Young Engineer.* His lecture was illustrated with slides.

The program was presented by the Young Engineers of the Chapter, who also arranged for musical entertainment.

Topographic Survey Explained In Topeka

Harold Hall, project engineer with the U. S. Topographical Branch of the U. S. Geological Survey, Rolla, Missouri, spoke on *The Work of the Topographic Survey in Kansas* before a recent meeting of the Topeka professional engineers.

P.E.'s At Work

NSPE members are making news every day in new jobs. . . . Francis W. Daniels has recently been named vice president in charge of engineering for the H. K. Ferguson Company of Cleveland, industrial engineers and builders. . . . John J. Heier, a past president of the Ohio SPE is the new chief of the planning and programming division of the Ohio State Highway Department. . . . Col. Walter L. Simpson, a past president of NSPE, is now engineering partner and chief consulting engineer project supervisor for Mott of Washington (D. C.) and Associates. . . . William G. Christy, until recently director of New York's Bureau of Smoke Control, has severed his connection with the city government and opened an office as a consulting engineer. . . . Dr. Cyril G. Veinott has joined the Reliance Electric & Engineering Company, Cleveland, O., as a consulting engineer on A-c. machinery. . . . Carl E. Schmitz has recently been appointed vice president in charge of Sales for Crane Packing Company, Chicago, Illinois. . . . Robert C. Findlay has just been named assistant manager of the Fenestra Building Panel Division of the Detroit Steel Products Company.

Manpower And The Navy Discussed In Wichita

Lieutenant Commander Corwin B. Briscoe, commanding officer of the Naval Reserve Center in Wichita, was guest of honor and speaker of the month at a recently-reported meeting of the local Wichita Chapter of the Kansas Society. He spoke on the subject of manpower utilization as it is affected by the Naval Reserve Program and also discussed efforts made by the Navy and the Reserve to utilize engineering skill within that service.

A question and answer period followed Commander Briscoe's address.

Stanislaus, Cal., Chapter Lists New Officers

New officers for the Stanislaus Chapter of the California SPE are as follows: President, Fred Johnson; First Vice-President, J. M. Grigsby; Second Vice-President, Harold B. Atherstone; Secretary-Treasurer, Mervin Bennett; Executive Committee, Lawrence Adams, Oliver Deatsch, and Merrill Adams; and State Director, F. J. Rossi, Sr.

The meeting at which the 1953 slate was selected was held in Modesto.

Successful Meeting

Oklahoma Convention Draws Large Crowd; NSPE Officials Attend As Speakers

Close to 350 engineers and their wives were in attendance at the Oklahoma Annual Meeting, held February 6 and 7 at the Skirvin Hotel in Oklahoma City. NSPE President John D. Coleman, Past President L. L. Dresser, and President-Designate T. Carr Forrest were the principal speakers.

President Coleman, in his address delivered at the closing session, urged engineers not to shirk their political responsibilities. "The professions," he said, "have a great stake and responsibility in the crusade to root out corruption since they belong to that group of 'good people' to whom Thomas Jefferson addressed his greatest creation, the Declaration of Independence."

Mr. Dresser emphasized the importance of professional engineers making substantial contributions to civic progress and development, and Mr. Forrest spoke on the necessity for a program building up the engineering profession to secure better recognition of engineers as professional men and community leaders.

Installation of the slate of new officers led by Dean W. H. Carson, head of the University of Oklahoma School of Engineering, who became the new president, was another highlight of the meeting. The other offices were filled as follows: First Vice President, Floyd Zook; Second Vice President, Roger Flanders; Secretary-Treasurer, Cecil Perkin; and Executive Secretary, C. W. Worley.

The speeches, discussions, and the business sessions were supplemented by an entertaining social program climaxed by a banquet and dance on the 7th. Dr. M. L. Wardell, professor of history at Oklahoma, was the banquet speaker.

Two Kansas Chapters Hold Joint Meeting

The Salina and Tri-Valley Chapters of the Kansas Society of Professional Engineers held a joint dinner meeting recently at the Neely cafe in Salina.

Walter G. Johnson, NSPE national director presented a report on the recent national meeting. Abram Pratt, president of the Kansas Society, also was a guest.

Augusta Chapter Officials

Pictured above are the 1953 officers of the Augusta Chapter, Georgia SPE. Seated, left to right, are: W. M. Cooper, Secretary; A. L. Matthews, President; and J. W. Swift, Treasurer. Standing are: H. A. Groves, State Representative and Chaplain, and Directors James Maples, Harry Zimmerman, and John Cook.

J. C. Patchen, Past President, and M. P. Phillips, also a Director, are not shown.

Western Wisconsin

New Officers Elected by Chapter Members; Air Conditioning Lecture Featured

At a recent meeting of the Western Chapter of the Wisconsin Society of Professional Engineers, held at the Hotel Linker in La Crosse, L. F. Kehoe was elected chapter President to succeed Carl Wahlstrom. Mr. Kehoe, who is an electrical engineer with the Dairyland Power Cooperative, received his engineering training at the University of Illinois and is also a member of the American Institute of Electrical Engineers.

Other new officers elected at the same time are: Merlin Eklund, distribution engineer with the Northern States Power Company, Vice-President; Fred Hayden, Highway Commission engineer, Secretary-Treasurer; and Andrew Esser, Trane Company, Director. Mr. Esser's term is for three years. All of the new officers will take over their duties next July 1 in accordance with recent changes in the by-laws made to provide incoming officers ample time to prepare to take over the offices.

Guest speaker of the evening was Allen C. Menke, a Trane Company engineer, who discussed *Human Comfort and Air Conditioning*, using slides to illustrate his talk. He was introduced by Program Chairman Kenneth Zurn.

Plans are also under way among chapter members for a joint meeting with the neighboring Minnesota engineers, a popular annual event sponsored by the group.

Air Pollution Confab Attracts NSPE Members

Professor Clifford A. Wojan of the Brooklyn Polytechnic Institute, a member of the Kings County Chapter, NYSSPE, recently served as chairman of a conference on the Control of Air Pollution, sponsored by the Institute. William G. Christy, another Kings County member, represented the New York Smoke Control Bureau at the meeting, which attracted an audience of more than 200 persons.

Membership Drive In Monroe County

Members of the Monroe County Chapter of the New York State Society of Professional Engineers are currently conducting an intensive membership campaign aimed at bringing in at least 40 new members by April 1. The slogan adopted for the drive is "Every Member Get a Member."

Two New Chapters Formed In Alabama

Two new chapters have been established recently by members of the Alabama SPE. The first was in Montgomery. The second, to be designated the "North Alabama Chapter," was organized at a meeting in Florence.

Officers of the Montgomery group are: Claude P. Owens, President; J. C. Clarke, First Vice-President; Thomas A. Riddle, Second Vice-President; H. D. Mosley, Secretary-Treasurer; and Jeff W. Davis, State Director.

The North Alabama officers include: H. M. Hargett, President; V. P. Crockett, First Vice-President; A. L. Clark, Second Vice-President; R. C. Roberts, Secretary-Treasurer; and W. M. Shannon, State Director.

Coleman Speaks In Cleveland

NSPE President John D. Coleman was the principal speaker for the recent 1953 Annual Dinner Meeting of the Cleveland Society of Professional Engineers.

At another recent meeting sponsored by the Society, Engineering Registration Certificates were presented to 250 new registrants by Walter Graff, chairman of the Ohio State Registration Board.

New officers for the Society include: J. E. Atchison, President; Leon D. Cleverly, Vice-President; R. H. Giles, Secretary; Fred Gaub, Treasurer; and T. F. Hindman, Historian.

Illinois SPE President Visits Rockford

Illinois SPE President A. Douglas Spicer was guest speaker at a recent meeting of the Rockford Chapter of the Society. Charles Debes was in charge of the meeting and presented a report on the Rockford area Civil Defense activities.

Lebanon County Engineers Hear Travel Talk

David A. Evans, a Philadelphia and Reading consulting engineer and a member of the Reading PSPE chapter, described his extensive European travels before a late meeting of the Lebanon County Chapter professional engineers. The talk covered his experiences in Germany, France, Belgium, Holland, Switzerland, and Austria.

Professional Status Is Lecture Topic

The Status of a Profession in Our Changing Times was the subject of a lecture given before a recent meeting of the Los Angeles Chapter, California SPE, by Dr. J. M. de los Reyes, a member of the Los Angeles County Medical Association. Members of the Ladies' Auxiliary also attended the meeting, which was held at the Mayan Hotel.

Use of the Professional Seal

The professional seal serves a double purpose; it identifies the practitioner whose name and number it bears and it indicates that the practitioner has obtained state authorization to engage in professional practice. In the first instance it locates the responsibility for the work with which it is connected, and in the second it stands as the hallmark of an acceptable degree of professional competence.

Because of these factors the use of the seal is rigidly circumscribed by law. Its validity springs directly from the license originally issued to the practitioner whom it identifies, and continues only as long as that license remains in force. As the grant of authority under the license is exclusive to the individual so the use of the seal is limited to work done by him or under his personal supervision by his regularly employed subordinates. The seal may not be given, lent or sold to any other person for professional purposes, nor may it be acquired, appropriated or used by another. . . . *N. Y. State Board of Engineer Examiners. (Contributed by the Florida Society.)*

Panel Discussion Held At New York Meeting

The Role of Engineering Organizations in Engineering - Management Communications was the topic for a panel discussion highlighting the February meeting of the New York Chapter of the NYSSPE. Executives taking part in the discussion were: Daniel F. Langenwalter, president of the Schenectady General Electric Engineers Association; John E. Taft, vice president, Engineers and Scientists of America; Dr. B. E. Shackelford, directory and past president of the Institute of Radio Engineers; and George J. Nicastro, past president of the New York State Society.

The New York Chapter has also passed the half-way point in working to its goal of adding 150 new members in 1952-53. J. R. Roitburd is membership chairman in charge of the drive.

Economy League Story Told In Rochester, Pa.

A recent meeting of the Beaver County Chapter of the Pennsylvania Society of Professional Engineers, held at the Penn-Beaver Hotel, Rochester, Pa., featured an address by J. G. Williams. Manager of the Beaver County Branch of the Pennsylvania Economy League, Mr. Williams described the growth of the organization and its relation to municipal problems.

MSPE Past President Addresses Western Mo.

C. Myron Lytle, immediate past president of the Missouri Society of Professional Engineers, was the featured speaker at a recent dinner meeting of the Western Chapter of the Society, held at the Wishbone Restaurant in Kansas City. His address, dealing with public relations problems of the engineering profession, was entitled *How the Leaders Do It.*

New Officers In Suffolk County

Officers for 1953, elected by the members of the Suffolk County Chapter, New York State SPE, include: John E. Stahlberg, President; Norman Parsons, First Vice-President; Charles Birs, Second Vice-President; Leland Fitts, Secretary; and Paul Goppoldt, Treasurer. Chapter directors also serving currently are: Fred Biele, Herbert Pearson, Albert Cass, Edward McGuinnis, John Ettinger, and John Blydenburgh.

Oregon Honoree

Fred O. McMillan

NSPE Member Named Engineer Of The Year In Oregon

Fred O. McMillan, head of the Department of Electrical Engineering at Oregon State College and an NSPE member, has been named Oregon's Engineer of the Year by the Professional Engineers of Oregon.

At the organization's annual banquet, outgoing president W. C. Williams presented a certificate of merit to Professor McMillan, citing him "for his many contributions to the engineering profession, for his inspirational guidance and indoctrination of the youth of Oregon in sound engineering principles and high professional ethics, and for the recognition he has brought to this state as national president of a founder society." The American Institute of Electrical Engineers, of which Mr. McMillan was the national president for the year ending in August 1952, is the society to which the citation referred.

Professor McMillan has been a member of the Oregon State faculty since 1920. In addition to his academic career, he has done extensive consulting work for utilities and various governmental agencies. He has carried on original research in radio interference, high voltage engineering problems, and electric fish screens. He is also the author of more than thirty technical publications.

The Professional Engineers of Oregon, who selected Mr. McMillan for this honor, are not as yet affiliated with the National Society.

New Officers Serving In Detroit

New officers of the Detroit Chapter of the Michigan Society now serving for the 1953 term include: Nathaniel O. Saulter, President; Ronald F. Smith, First Vice President; Clyde T. Oakley, Second Vice President; John W. Wickey, Secretary; and Norman E. Colburn, Jr., Treasurer.

Three new directors were also elected to serve the three-year term from 1953 to 1956. They are Arno Koch, Samual A. Walker, Jr., and Henry W. Wallace. Other directors whose terms are still running include David S. Falk, E. P. Light, George B. Uicker, Donald J. Henry, A. H. Patterson, and Herbert E. Ziel.

Everett Martin is the immediate Past President of the chapter.

Albany Banker Addresses Chapter

William G. Furlong, assistant vice president of the National Commercial Bank of Albany, New York, gave his predictions for 1953 from a banker's viewpoint at a recent meeting of the Albany County Chapter of the New York State SPE. His talk was preceded by a dinner.

Point Four Lecture For Knoxville Group

Members of the Knoxville Chapter of the Tennessee Society and the ladies' auxiliary group recently heard a discussion of the application of the Point Four Program in Greece at a joint dinner meeting. Dr. and Mrs. Leland G. Allbaugh, who have recently returned from Greece where Dr. Allbaugh worked with the Program, made the presentation. Dr. Allbaugh is currently serving as head of the Agricultural Relations Division of the Tennessee Valley Authority.

Lecture and Movie In West Lynn, Mass.

Engineers in Wonderland was the title given the lecture delivered by Howard W. Bennett before a recent meeting of the North Shore Chapter of the Massachusetts SPE, held in the General Electric Auditorium in West Lynn. Mr. Bennett is manager of the Employee and Plant Community Relations Services Division of GE.

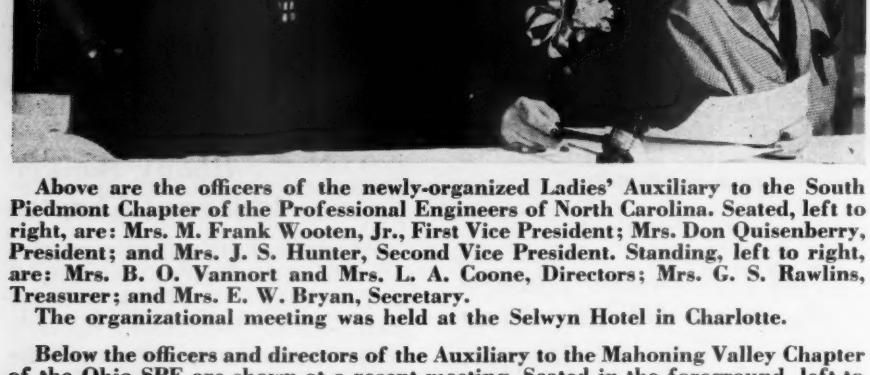
A second feature of the meeting was the showing of a movie, *Freedom and Power,* which depicted the contributions of the electrical industry to the development of the United States.

Auxiliary Groups

Above are the officers of the newly-organized Ladies' Auxiliary to the South Piedmont Chapter of the Professional Engineers of North Carolina. Seated, left to right, are: Mrs. M. Frank Wooten, Jr., First Vice President; Mrs. Don Quisenberry, President; and Mrs. J. S. Hunter, Second Vice President. Standing, left to right, are: Mrs. B. O. Vannort and Mrs. L. A. Coone, Directors; Mrs. G. S. Rawlins, Treasurer; and Mrs. E. W. Bryan, Secretary.

The organizational meeting was held at the Selwyn Hotel in Charlotte.

Below the officers and directors of the Auxiliary to the Mahoning Valley Chapter of the Ohio SPE are shown at a recent meeting. Seated in the foreground, left to right, are: Mrs. H. Withers, Treasurer; Mrs. N. Cox, Vice President; and Mrs. C. Conklin, Secretary. Behind them are: Mrs. R. Pool, Mrs. A. Findley, and Mrs. A. Leedy, Directors; Mrs. L. Fawcett, Director and Past President; and Mrs. Richard Evans, President.



Engineering Unity Is St. Louis Topic

Alexander Van Praag, Jr., of Warren and Van Praag, Decatur, Illinois, was the main speaker at the January meeting of the St. Louis Chapter of the Missouri Society of Professional Engineers. The subject he chose for his address was *The Price We Must Pay for Unity in the Engineering Profession.*

Flood Control Talk In Kansas City

Colonel L. J. Lincoln, district engineer for the Kansas City area, was the guest speaker at a late February meeting of the Central Chapter of the Missouri Society of Professional Engineers. His talk was concerned with flood control problems.

Engineer C. H. McAtee, program chairman, arranged the meeting.

With the Ladies

By MRS. WILLIAM FELL
Chairman, NSPE Ladies' Advisory Committee

Ladies of the Auxiliary to the Panhandle Chapter, Texas SPE, were hostesses to visiting engineers' wives at the Annual Meeting of the Society in Amarillo, January 22-25. Recreational highlights of the convention were the fashion show and luncheon at the Amarillo Country Club, the Chuck Wagon Dinner and Engineers' Ball where Western attire and informality prevailed, and a motor tour of Canyon Palo Duro. Twenty-five ladies representing the eleven auxiliaries of TSPE met in a business session to hear reports of the Ladies' Inter-Auxiliary Committee and the Auxiliary Advisory Committee of TSPE concerning possible organization of an auxiliary at state level. Recommendation that investigation of the possibility be continued was made by the committees and accepted by the group. Mrs. L. J. Roberts, president of the Panhandle Auxiliary, presided at the meeting.

Visiting ladies at the Annual Meeting of the Oklahoma SPE in Oklahoma City, February 6 and 7, were entertained by the Auxiliary to the Central Oklahoma Chapter with an inspection tour of WKY-TV Studio, a tea, hobby show, floral demonstration, style show and joint dinner and dance with the engineers. During a business session an Inter-Auxiliary Committee was appointed to investigate possibilities for extension of chapter auxiliaries and prospects for organization of an auxiliary at state level. Members of the committee are: Mrs. H. L. Pickens, president of the Central Oklahoma Chapter Auxiliary; Mrs. Cline Mansur, president of the Tulsa Chapter Auxiliary; and Mrs. W. H. Carson, Mrs. J. Roy Black, and the incoming presidents of the two chapter auxiliaries.

Missouri SPE To Study EIT Situation

A twelve-member Engineer-In-Training Committee, composed chiefly of EIT's has been appointed by the Missouri Society and charged with the task of gathering information relative to the attitudes of young engineers, evaluating the information, and making recommendations for a program to the Board of Directors. The Board then hopes to set in motion a program of action that will be of interest and value to the young engineers.

Kings County Conducts Engineering Review

A series of review courses in preparation for New York State's June examinations for professional engineer licenses is currently being conducted by the Kings County Chapter. The subjects covered in the review are *Structural Planning and Design; Basic Engineering Sciences*—including mechanics, thermodynamics, hydraulics, and electricity; and *Economics of Engineering and Professional Practice.*

The lectures, which are being given at the Brooklyn Engineers Club, are open to all persons seeking refresher courses in engineering fundamentals as well as to those preparing for the examinations. They are approved by the Veterans Administration for veterans under the GI Bill of Rights and also by the New York State Society of Professional Engineers. This is the fifth year that the Kings County Chapter has conducted the review.

College Athletics Lecture At Ann Arbor

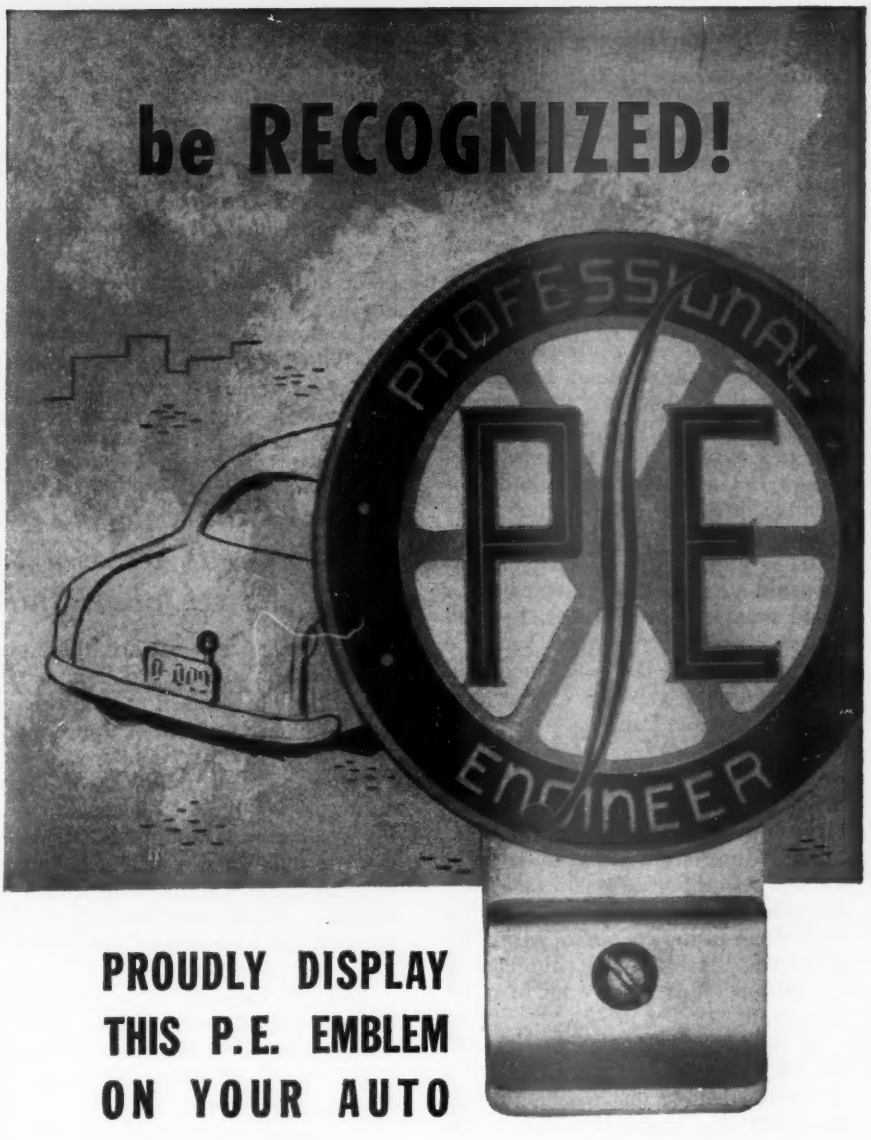
Members of the Ann Arbor Chapter of the Michigan SPE recently heard Dean J. B. Edmonson, Chairman of the Committee on Athletics of the North Central Association of Colleges and Secondary Schools, talk on the subject of *Intercollegiate Athletics.* Because of the general interest in this subject, members of the other Michigan chapters and their wives were also invited to attend. The lecture was preceded by a dinner.

Sabine Chapter Hears Former Pennsylvanian

Members of the Sabine Chapter, Texas SPE, recently heard a lecture by E. W. Pittman, the retired chief engineer of the Pennsylvania shipyards. In addition to being an engineer, Mr. Pittman is also an astronomer, and the latter interest dictated the subject of his address—*Aspects of the Solar System.*

Paul Klepper Named "Engineer Of The Month"

Engineer Paul Klepper, a member of the Kings County Chapter of the New York State SPE, was designated "Engineer of the Month" in the January issue of the Brooklyn Engineers' Club Bulletin. A civil engineer, he is currently serving in the office of the Borough President of Brooklyn, Division of Sewer Design.



PROUDLY DISPLAY THIS P.E. EMBLEM ON YOUR AUTO

This distinctive 3¼-inch emblem belongs on your car. It comes complete, ready to attach to your license plate. On heavy metal, it is built to last. Colors are black and gold. *ORDER YOURS NOW!*

MAIL THIS COUPON TODAY!

National Society of Professional Engineers
1121 Fifteenth St., N. W., Washington 5, D. C.

Please send me at once the 3¼-inch P.E. Emblem for my car. I enclose.....check.....money order for $2.50 to cover the cost of the emblem, handling and mailing charges. Send to:

(Name) .....

(Address) .....

(City)..... (State).....

I am registered in (name of state).....

I am.....am not.....a member of NSPE.

Professional Briefs

(*Continued from page 7*)

president of the New York State Society and first president of NSPE, declares that "this may be one of the most important battles we have had in many years." The 1935 amendment restricting the practice of engineering by corporations was an "absolute must," according to Dr. Steinman, "for without it our professional law is a farce." The prominent bridge engineer declares that "any incompetent or unqualified individual who was unable to secure a P.E. license was able, before 1935, to incorporate and proceed to practice engineering while thumbing his nose at our law.

"It is of course true that some of us could save on income taxes if we could incorporate. However, I would rather make the financial sacrifice than to see our law weakened and nullified at the expense of our best professional standards.

". . . there has been a trend in recent years to change engineering practice from an individual professional service to a big business. The emphasis is shifting from professional ability and reputation to business ability and promotion. These things are always done in the corporate form. All of us who have the best interests of the profession at heart want to resist this trend.

"I hope that our State Society will not be caught asleep this time and I feel very strongly that we should mobilize all our strength to fight this proposed legislation."

NSF Director Urges Federal Support For Basic Research

Dr. Alan T. Waterman, director of the National Science Foundation, recently urged more Federal support for basic scientific research in the universities to balance the effect of applied research and development work upon science teaching and fundamental research in educational institutions in the United States.

Speaking before the Southwestern Conference of the Institute of Radio Engineers in San Antonio, Texas, Dr. Waterman pointed out that institutions of higher learning constitute the main source of new scientific knowledge and of highly trained scientists. Since in these critical times the United States must continue defense research and development at full speed, he emphasized that additional support for basic research is of the utmost importance to encourage the universities in resuming their traditional role in research and education.

There has been an increasing tendency to drop this role, he explained, in favor of handling practical scientific problems only. Such applied work, Dr. Waterman said, should not consume all of the universities' research and training resources. He proposed that, when current defense needs are less pressing, university leaders and Federal officials should study the possibility of channeling a larger part of the Government's practical research problems into industry or into its own laboratories.

All Carnegie Tech Grads Are Assured Of Jobs In June

Engineering and Science graduates at Carnegie Institute of Technology are few in comparison to the number of jobs awaiting them at graduation.

Charles E. Wangeman, Head of the Placements Bureau at Carnegie announced that there are over two jobs for every male graduate in the engineering and science fields. Carnegie will graduate 454 bachelor and 277 advance degree candidates from the engineering, science and management programs June 6.

This shortage is expected to increase within the next few years since military service will continue to add to the scarcity of male graduates eligible for employment.

"Sixty-five per cent of the men in this year's graduating class at Carnegie," said Mr. Wangeman, "are eligible for military service while 21% are already in ROTC or some other reserve component."

Added to this is the fact that the percentage of ROTC graduates alone at Carnegie will jump to nearly 50% by 1955 thus making an even smaller number of men available at graduation for business and industry.

The trend in major companies with an eye to the future, Mr. Wangeman noted, seems to be a re-arrangement of their work assignments so that the few men available upon graduation are hired into positions which will utilize to the fullest extent their engineering and scientific backgrounds. "The result is," he said, "that women graduates and non-technical personnel will eventually have a better opportunity for less technical jobs normally given to young male graduates."

Mr. Wangeman said that interview dates with 275 companies have already been scheduled on the campus. Others are still negotiating for dates and the total may reach 325 before the end of the school year. Last spring some 315 business and industrial concerns recruited graduates at the institution. He estimated that by June about 750 different companies will have contacted Carnegie for graduating seniors.

The average monthly salary offered to male graduates with a Bachelor of Science degree is $350 representing an increase of $25.00 over last year's figure. A man with a master's degree can expect about $390 a month and a man with a doctorate a minimum of $515.

Last year 72% of the male graduates from Carnegie went into industry, 21% into academic pursuits and 7% into government services, either in a civilian capacity or with the armed services. Of the 72% that entered industry, 30% went with firms in the Pittsburgh metropolitan area and 70% with organizations in other parts of the country.

"Two-Campus Plan" In Pa. Aids Engineer Training

A new program to help provide higher education's answer to the critical shortage of well-trained engineers has recently been adopted by the University of Pennsylvania and two smaller liberal arts colleges in the state. The new "two-campus plan" calls for a five-year course of study wherein qualified students can earn a bachelor of art degree in three years at Franklin and Marshall College in Lancaster or Ursinus College in Collegeville, Pa., and then transfer to the University in Philadelphia for a two-year course leading to a bachelor of science degree.

Students from the liberal arts colleges will specialize at Pennsylvania in chemical, electrical, civil, mechanical, or metallurgical engineering. They will study in the Towne or Moore Schools of the University.

The coordinator for this experiment is Dr. Charles W. MacGregor, vice-president in charge of engineering studies at the University. He is also a member of the Philadelphia Chapter of the PSPE.

A similar two-campus program has also recently been announced by the University of Pittsburgh, cooperating with five smaller colleges in that area.

It won't hurt you to give a little when it means so much. See your local blood bank.

Letters

(*Continued from page 29*)

engineer has a good code of ethics and believes that by diligence and hard work he will attain a good station in life. He accepts the job offered in industry and does creditable work for the employer. He hopes to pay off the indebtedness incurred for his college degree in short order and enjoy more of the luxuries of life. The illusion is lost when he notices that recent high school graduates, four or five years younger, are buying better clothes and possibly an automobile; even enjoying more expensive forms of amusement. The illusion is shattered when he awakes to the fact that he has become so proficient on the drafting board or clerical job that others are receiving promotions while he is literally frozen in his job. After some two to five years of experience he looks for better pay elsewhere. Here he finds that a prospective employer wants his experience, gives a rosy picture of a good position in the future, but offers the same rate of pay being given to recent graduates. Some few men turn to other lines of endeavor, forsaking engineering entirely. At least one acquaintance who went into another line of work said "I really enjoy engineering and love it but I cannot afford to court my love so I must forsake it."

6. To summarize, it does not appear that there is a shortage of men (and women) who have been educated and trained as engineers. It is true that many of those so qualified are not employed to their best ability as engineers. These must be relieved from their present duties as draftsmen, clerks or other non-technical assignments.

As an item for public relations, I suggest that a copy of the AMERICAN ENGINEER be mailed to the home address of every registered Professional Engineer who is not presently on the mailing list. Perhaps more women would read the publication and become interested in the profession.

The feature article by Gilbert Grosvenor is very good. You are doing good work in turning out such a fine periodical.

C. T. WARREN, JR., P.E.,
Orange, Tex.

Society Objectives . . .

Dear Editor:

The question of the objectives and purpose of the National Society of Professional Engineers always makes its appearance in a conversation with a prospective member. It is not difficult to present the 18 points mentioned in the chapter handbook having the title, "The National Society of Professional Engineers Offers You." This is indeed a challenging list for the Registered Engineer.

The general objective of the Society is to promote the economic, social and professional status of the Registered Engineer, which is one of the 18 points. Now, what should be the individual philosophy toward the Society? Should the individual consider only what the Society has to offer him or should the individual take the service attitude by considering what the Society has to offer mankind? As a result of analysis of the previous question, the following philosophy seems manifest to me.

NSPE offers me the opportunity to work on the local, state and national level with men registered in each of the branches of engineering, helping to improve our economic, social and professional status. NSPE offers me the conference table over which registered engineers can discuss their problems, compromise their differences, to the benefit of the engineering profession and mankind and drive forward, a united organization, finally accomplishing the status which they will have earned.

It certainly would be pleasant to see the previously mentioned objectives accomplished in my lifetime, but I feel improvements will be slow and painful and many will fall by the wayside thinking the cause lost. If my meager financial, time and energy contributions help to improve the status of future generations of engineers, our children or our children's children, my objective will have been accomplished.

How wonderful, that NSPE offers me the opportunity to try to improve the status of present and future registered engineers through a united effort of all registered engineers. I cannot realize how much all mankind would benefit as a result of that which could be accomplished.

This, NSPE offers to me.

E. C. GLOVER, P.E.,
Treasurer, CSPE,
San Jose, Calif.

Gov't. Recognition . . .

Dear Editor:

Again the Professional Engineer is not recognized—and by his own Government. The Civil Service Commission does not directly recognize a P. E. as an engineer. In rating an individual for an engineering position, the Commission does not accredit a Registered P. E. as such. It is possible to be a P. E. and yet not considered qualified as an engineer by Civil Service. That does not seem possible but it's being done although, standards for a P. E. are as high as those of Civil Service, if not higher.

Legally, a man is not an engineer until registered, just as in medicine and law. Yet, Civil Service recognizes this in medicine and law but not in engineering.

The Professional Engineering Society should investigate this existing condition and instigate some corrective action as soon as possible. When the Civil Service Commission automatically recognizes the P. E., it will be a great step forward in our National recognition.

VIRGIL S. GULINO, P.E.,
Dayton, Ohio

► Engineer Gulino's views on this subject are most interesting, particularly since they coincide with the position of the National Society of Professional Engineers. NSPE has endeavored for a number of years to bring the Civil Service Commission around to the view that professional engineers employed by the government should be registered under appropriate state laws; but we have been met consistently with the argument that because registration requirements and standards vary so among the different states, and because some states do not require registration in all branches, and many engineers are exempt from registration because of their type of employment, it would not be feasible or practical to impose the registration requirement for federal employment of engineers.

Of course, all of these objections can be answered to one degree or another and NSPE has attempted to get the CSC to use the registration standard to the fullest possible extent, even though some limitations and problems do exist. We have reached the point where we are assured by the Commission that registration is considered as one of the factors in evaluating the qualifications of an applicant for a federal position as an engineer, but evidently they are not yet ready to go the whole way. In fact, they claim that technically there is no requirement that an individual must be registered as a doctor or lawyer to obtain employment by the federal government in those fields. As a matter of practice, however, we are quite sure there are few if any legal or medical positions in the government which are not filled by those who are registered in the appropriate profession.

Another facet of this problem, of course, is the fact that of the approximately 400,000 to 500,000 engineers in the country, as reported in the U. S. Census figures, only 175,000 are registered. Whether all of these 400,000 to 500,000 engineers are truly professional engineers according to our understanding of the term is a debatable point, but it is a point which the CSC and the other government agencies use in giving their reasons against a registration requirement for federal employment.—*Editor.*

NSPE Members Speak At Northwestern U

Six NSPE engineers were among the featured participants in the fifth College-Industry Conference at Northwestern University recently. The theme selected for the conference was *Opportunities in Engineering.* The Society men and their subjects included: Titus G. LeClair, chief staff engineer, Commonwealth Edison Company—*What Can Employers Do to Overcome the Shortage?* Kurt F. Wendt, University of Wisconsin—*Do We Discourage Too Many Potential Engineers?* and George A. Sievers, President, Industrial Engineering Institute—*Personal Motivations in Industry.* E. C. Koerper of the A. O. Smith Corporation was Chairman of a panel discussing *The Professional Outlook on Shortages and Better Utilization* for which Ovid W. Eshbach, Dean of the Northwestern Technological Institute, presented the viewpoint of local engineering societies and Edward W. Seeger, Vice-President of Cutler-Hammer, Inc., and Regional Vice-President of NSPE, gave the viewpoint of registered professional engineers.

Of the American Engineer readers queried in a recent survey . . .

78.4% have a purchasing or specifying capacity.

Tell Your story in the American Engineer to the men who sign the orders!

Member State Societies' Officers and Directors

Alabama

Pres., Wallace J. McRoy, 2129 7th Ave., N., Birmingham, Ala.
Sec., H. K. Weaver, 504 Watts Bldg., Birmingham, Ala.
Nat. Dir., Leonard W. Peterson, 812 Fifth Ave., N., Birmingham, Ala.

Arizona

Pres., Dario Travaini, 69 W. Wilshire Dr., Phoenix, Arizona.
Sec. Treas., H. H. Brown, 929 W. Lynwood, Phoenix, Ariz.
Nat. Dir., W. A. Burg, 108 W. Elm Dr., Phoenix, Ariz.

Arkansas

Pres., Beverly E. Ryan, 203 Midland Ave., Little Rock, Ark.
Sec., Jack H. Wilson, 2508 N. Pierce St., Little Rock, Ark.
Nat. Dir., R. J. Rhinehart, 411 Main St., Pine Bluff, Ark.

California

Pres., George E. Zelhart, 2007 Farris, Fresno, Calif.
Sec., Clyde N. Bradley, 446 Blackstone, Fresno, Calif.
Nat. Dir., Oliver Deatsch, Rt. 6—1436, Modesto, Calif.

Colorado

Pres., Hugh W. Hempel, 1733 California St., Denver 2, Col.
Sec., George C. Hanson, 601 Insurance Bldg., Denver, Col.
Nat. Dir., Alfred J. Ryan, 1340 Glenarm Pl., Denver, Col.

Connecticut

Pres., John J. Macchi, 53 Preston St., Hartford, Conn.
Sec., John Hamill, 54 Crest St., Wethersfield, Conn.
Nat. Dir., Henry Pfisterer, 111 Whitney Ave., New Haven, Conn.

Delaware

Pres., Ernest S. Van Demark, 506 Rodney Court Apts., Wilmington, Del.
Sec., Henry S. Mauk, 116 Cleveland Ave., McDaniel Heights, Wilmington, Del.
Nat. Dir., William A. McWilliams, 43 Division St., Dover, Del.

District of Columbia

Pres., Paul S. Dell'Aria, 5209 25th Rd., N., Arlington, Va.
Sec., Michael Godfrey, P.O. Box 585, Benj. Franklin Sta., Washington 4, D. C.
Nat. Dir., Joseph H. Powers, 1750 16th St., NW, Washington, D. C.

Florida

Pres., Stanley Warth, Southern Bell T & T. Co., Jacksonville, Fla.
Sec., C. D. Hartman, P.O. Box 1005, West Palm Beach, Fla.
Nat. Dir., E. A. Anderson, 1301 Court House, Miami 32, Fla.

Georgia

Pres., Ray L. Sweigert, Georgia Institute of Technology, Atlanta, Ga.
Sec., George M. Normandy, P.O. Box 520, Atlanta 1, Ga.
Nat. Dirs., Roy J. Boston, 12 Capitol Square, SW, Atlanta 3, Ga.; Orbie Bostick, P.O. Box 4569, Atlanta 2, Ga.

Idaho

Pres., Ellis L. Mathes, Dept. of Highways, 603 Main St., Boise, Idaho.
Sec., W. Purdy Eaton, 1704 Harrison Blvd., Boise, Idaho.
Nat. Dir., Leigh M. Huggins, 1621 Mountain View Drive, Boise, Idaho

Illinois

Pres., A. Douglas Spicer, 138 Payson Ave., Kewanee, Ill.
Asst. Sec., P. E. Roberts, 631 E. Green St., Champaign, Ill.
Sec., H. E. Babbitt, 204 Engineering Hall, Urbana, Ill.
Nat. Dirs., Wm. A. Oliver, 218 Engineering Hall, Urbana, Ill.; George DeMent, Rm. 1940, 20 N. Wacker Dr., Chicago 6, Ill.

Indiana

Pres., E. G. Hinshaw, 240 N. Meridian St., Indianapolis, Indiana.
Exec. Sec., Thelma G. Patterson, 1131 Circle Tower Bldg., Indianapolis, Indiana.
Nat. Dir., L. Eugene Easley, 6511 Evanston Ave., Indianapolis, Indiana.

Kansas

Pres., Abram Pratt, 403 Crawford Bldg., Topeka, Kansas.
Sec., James E. Myers, 1111 East Central, Wichita, Kansas.
Nat. Dir., Walter G. Johnson, 1831 Medford Ave., Topeka, Kansas.

Maryland

Pres., James J. O'Donnell, 1531 Windemere Ave., Baltimore 18, Maryland.
Sec. Treas., William G. Robertson, Jr., Henry Adams, Inc., 2315 St. Paul St., Baltimore 18, Md.
Nat. Dir., Owen W. Turpin, 1004 N. Charles St., Baltimore, Md.

Massachusetts

Pres., Charles T. Chave, Stone & Webster Engineering Corp., 49 Federal St., Boston 7, Mass.
Sec., Fred A. Sawyer, Stone & Webster Engineering Corp., 49 Federal St., Boston 7, Mass.
Nat. Dirs., Edwin R. Gardner, 4 Walnut Rd., Swampscott, Mass.; Ernest L. Blair, Stone & Webster Engineering Corp., 49 Federal St., Boston 7, Mass.

Michigan

Pres., Paul S. Calkins, 23230 Power Rd., Farmington, Mich.
Sec., Robert L. Wells, 100 Farnsworth Ave., Detroit 2, Mich.
Nat. Dirs., A. F. Plant, 227 Curtis Bldg., Detroit, Mich.; Otto H. Hall, 1414 Sunnyside, Lansing 10, Mich.

Minnesota

Pres., Charles E. Doell, 3954 Bryant Ave., S., Minneapolis 8, Minn.
Exec. Sec., Hal E. McWethy, 1000 Guardian Bldg., St. Paul, Minn.
Nat. Dirs., M. C. Peterson, 5524 Morgan Ave., S., Minneapolis, Minn.; T. S. Thompson, 1246 University Ave., St. Paul, Minn.

Missouri

Pres., C. Myron Lytle, Box 679, Kansas City, Missouri.
Exec. Sec., Clifford Wood, Box 365, Jefferson City, Mo.
Nat. Dirs., Prof. Joe Butler, Missouri School of Mines, Rolla, Mo.; Garvin H. Dyer, 123 W. Kansas St., Independence, Mo.

Nebraska

Pres., John D. Griffiths, 954 South 58th St., Omaha, Nebraska.
Sec., John P. Rossie, 7712 N. 31st St., Omaha, Neb.
Nat. Dir., Edward Foster, 4360 Nicholas St., Omaha 6, Neb.

Nevada

Pres., George Von Tobel, 214 S. 2nd St., Las Vegas, Nev.
Sec., R. C. Barger, Box 338, Henderson, Nevada.
Nat. Dir., Robert Millard, 909 Canyon St., Ely, Nev.

New York

Pres., Edward J. Nunan, 31 Woodward Ave., Buffalo 14, N. Y.
Exec. Sec., Herald Beckjorden, 1941 Grand Central Terminal Bldg., New York, N. Y.
Nat. Dirs., C. Arnold Dutton, 75 W. Mohawk St., Buffalo 2, New York; Thomas M. Linville, 1147 Wendell Ave., Schenectady 8, N. Y.

New Jersey

Pres., Louis F. Frazza, 225 Bamford Ave., Hawthorne, N. J.
Sec., Treas., Merle Powers, 86 E. State St., Trenton, N. J.
Exec. Dir., Charles J. Dodge, 86 E. State St., Trenton, N. J.
Nat. Dirs., Leo K. McKee, 16 McLaren St., Red Bank, N. J.; Frank P. Cooper, 416 Maple Pl., Cranford, N. J.; Merton S. Adams, 9 Oakland Ave., Trenton, N. J.; W. Earl Christian, Netherwood Ave., Box 215, Rt. 2, New Brunswick, N. J.

New Mexico

Pres., Charles E. Barnhart, 2722 Hyder Dr., Albuquerque, N. M.
Ex. Sec., D. R. W. Wager-Smith, Box 4053, Albuquerque, N. M.
Nat. Dir., Walter K. Wagner, 412 Lafayette Pl., Albuquerque, N. M.

North Carolina

Pres., W. F. Freeman, 116 East Commerce St., High Point, N. C.
Sec., Frank B. Turner, Box 923, Raleigh, N. C.
Nat. Dir., M. F. Wooten, Jr., 215 Latta Arcade, Charlotte, N. C.

North Dakota

Pres., Edward J. Booth, 804 Tenth St., Bismarck, N. D.
Sec., Treas., Joseph Kirby, 827 13th St., Bismarck, N. D.
Nat. Dir., R. H. Myhra, Box 112, Minot, N. D.

Ohio

Pres., R. A. Freese, 1516 Keith Bldg., Cleveland, Ohio.
Exec. Sec., Lloyd A. Chacey, 5 East Long St., Columbus, Ohio.
Nat. Dir., Robert E. Allen, 401 Leo St., Dayton, Ohio.

Oklahoma

Pres., Dean W. H. Carson, 943 Chautauqua St., Norman, Okla.
Exec. Sec., C. S. Worley, P. O. Box 94, Oklahoma City, Okla.
Nat. Dir., Clark A. Dunn, A & M College, Stillwater, Okla.

Pennsylvania

Pres., Ezra K. Nicholson, 1618 Latimer St., Philadelphia, Pa.
Exec. Sec., John T. West, Jr., 228 Second St., Harrisburg, Pa.
Nat. Dirs., Ezra K. Nicholson, 1618 Latimer St., Philadelphia, Pa.; J. D. Carpenter, 600 N. Second St., Harrisburg, Penna.; Robert A. Blackburn, 3110 Koppers Bldg., Pittsburgh, Penna.; Allan H. Kidder, Sansom St., Philadelphia 5, Penna.

Puerto Rico

Pres., Alberto Hernandez, P. O. Box [illegible], San Juan, Puerto Rico.
Sec., Walter Torres Braschi, Box [illegible], Hato Rey, Puerto Rico.
Nat. Dir., Alberto Hernandez, Box [illegible], San Juan, Puerto Rico.

Rhode Island

Pres., Domenic A. Ionata, 472 Academy Ave., Providence, R. I.
Sec., Louis R. Hampton, 30 Algonquin Dr., Edgewood 5, R. I.
Nat. Dir., Vincent DiMase, 10 Edendale Ave., Providence, R. I.

South Carolina

Pres., C. T. Wise, P.O. Box 960 Greenville, S. C.
Sec. Treas., L. L. Paxson, 219 Rice St., Greenville, S. C.
Nat. Dir., R. K. Rouse, 104 E. Stone Ave., Greenville, South Carolina.

Tennessee

Pres., Lorin B. Allen, 55 McCall Pl., Memphis, Tenn.
Sec., Geo. Flinn, 787 S. Willett St., Memphis, Tenn.
Nat. Dir., Warner Howe, 76 Porter Bldg., Memphis, Tenn.

Texas

Pres., J. Neils Thompson, 2403 Tower Dr., Austin, Tex.
Exec. Sec., Wallace M. Driskell, Jr., 4[illegible] Nash Building, Austin, Tex.
Nat. Dir., Elgin B. Robertson, 1339 Plowman, Dallas, Tex.

Utah

Pres., Harold S. Carter, Univ. of Utah, Salt Lake City, Utah.
Sec., George A. Howarth, 1430 Blaine Ave., Salt Lake City, Utah.
Nat. Dir., Walter P. Henoch, 227 South 4th East, Salt Lake City, Utah.

Virginia

Pres., Dan Pietta, Box 366, Blacksburg, Va.
Sec., R. P. Alvey, Jr., 3315 W. Broad St., Richmond, Va.
Nat. Dir., John B. McGaughy, 21st & Llewellyn Ave., Norfolk, Va.

Washington

Pres., L. R. Durkee, 511 New World Life Bldg., Seattle 4, Wash.
Ex. Sec., Ed Smith, Organization Service Bureau, American Building Seattle 4, Washington.
Nat. Dir., Howard A. Stingle, E. [illegible] 30th, Spokane 6, Wash.

West Virginia

Pres., O. J. Swanson, Box 27, Gary, W. Va.
Exec. Sec., Ross B. Johnston, P.O. Box 249, Charleston, West Virginia.
Nat. Dir., Leslie C. Gates, P. O. Box 672, Beckley, West Virginia.
Nat. Dir., Harry G. Kennedy, 1307 Kanawha Valley Bldg., Charleston, W. Va.

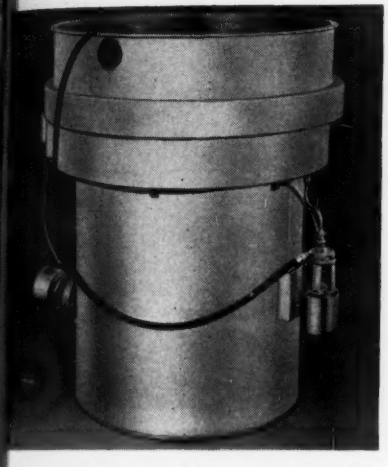
Wisconsin

Pres., R. C. Clark, 311 Losey Blvd. N., La Crosse, Wis.
Sec., W. G. Youngquist, 201 Kensington Drive, Madison, Wisc.
Nat. Dirs., A. J. Behling, 2326 S. 75th St., Milwaukee 14, Wisc.; George Martin, Metro Sewerage Dept., P.O. Box 247, Green Bay, Wisc.

What's New

As a service to our readers, this column will describe briefly new product developments of general interest to professional engineers. For further information concerning these products, we will appreciate your filling in the coupon provided for this purpose, and mailing it to the American Engineer.

The Detrex VS Jr. degreaser is now being produced by the Detrex Corporation. Designed to clean small and medium-sized parts, the compact unit is suitable for shops, laboratories, and small manufacturing plants where production up to 600 lbs. of steel per hour must be degreased.



Two standard, manually operated models of the degreaser are available. One is electrically heated; the other operates by steam. Both may be easily relocated at any time in various work areas as long as service facilities are available.

In operation parts are suspended in pure solvent vapor which quickly dissolves dirt and grease; a spray of hot solvent flushes away any loose or stubborn dirt remaining; and, finally, a rinse in pure solvent vapor leaves the work clean and dry. Items to be degreased may be placed in baskets or on racks or hooks for easy handling; they can be carried in and out of the degreaser either by hand or by a small hoist.

The equipment is only 48 inches from the top to the base. The interior is protected with a non-porous, corrosion-proof coating. Installation is simple and inexpensive. ***Item 1.***

•

A new system of all-bolted steel framing for efficient materials handling and storage has just been introduced by Flexa Steel Products, Inc. Easily installed and completely adjustable, the new racking system is designed for use in plants, offices, stores, shops, and warehouses.

It consists of a series of cold rolled steel channels, case hardened serrated nuts, bolts, and a wide variety of fittings suitable for any type of joint or connection. Four basic channel sections, two each in 12 and 14 gauge, are featured, permitting the erection of any desired rack design regardless of size or capacity.

According to the manufacturer, the unique design of the nuts used in the system eliminates the need for skilled labor in its assembly. No welding or drilling is required.

Flexa channels and fittings, it is claimed, can be designed for loads up to 5,000 lbs. per pallet when used for pallet racks. For storing bar stock, they provide a load carrying capacity of thousands of tons. The racks are safe and accessible and can be rearranged, expanded, or moved with relative ease. ***Item 2.***

•

Design of a PROTO Torque-Limiting Wrench without the usual external indicating devices has been announced by the Plomb Tool Company.

The new wrench differs from most conventional types in four basic respects—It is a torque-*limiting* device, releasing automatically at the proper setting (not a torque-indicating device requiring dials, scales, etc.). It employs a fully enclosed precision spring under compression as the principal torque-controlling element. It uses an accurate micrometer-type adjustment. Finally, models with a built-in reversible ratchet head that do the work of both a ratchet and a torque wrench are available.

Desired torque is set by turning the handle. When the right torque is reached by pulling the handle, the wrench releases automatically and signals the operator with a positive reflex action.

Six models are currently available—three with ratchet head and three with plain head. Capacities are 5-75 or 10-150 ft.-lbs. Drive sizes are ⅜″ or ½″. ***Item 3.***

•

A turntable, called the FLEXI-TURN, has recently been announced by Gale Dorothea Mechanisms. Termed by the manufacturer "the turntable with a brain," the new production tool is controllable from a remote point, instantly reversible, and completely variable in speed from 0 to 20 RPM.

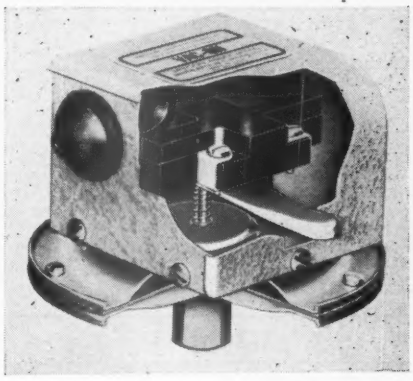
It can be used in many different production processes, including testing, gauging, and inspecting; packaging, packing, and collating; soldering, bronzing, and welding; and assembly. It is an ideal tool where work speed should vary with the run, job, or operation. It can also be employed for some display purposes.

Equipped with a 1/15 H.P. motor drive operating through a heavy-duty speed reducer, the Flexi-Turn's disc is 18″ in diameter, mounted on a heavy 11″ diameter casting which can handle any load up to 200 pounds. The unit has excellent timing capacity throughout the speed range which does not drop off at low speeds. Standing 6″ high, the Flexi-Turn has a base plate 24″ x 20″.

The remote-control "brain" of the tool includes an on-off switch, a light that indicates when the turntable is running, and a single dial to set speed and control acceleration and deceleration, as well as a forward-reverse switch and a switch to double or halve the speed instantly. ***Item 4.***

•

A new, inexpensive vacuum switch that shuts off the power source when liquid supply runs dry has been introduced recently by Jaycon Associates. Called the VAC-ON switch, it is designed for use with electric motors and gasoline engines. According to the manufacturer, the switch offers unlimited possible industrial, marine, and manufacturing applications as a circuit-breaker or control where the safety of equipment depends on a suction-delivered lubricant, fuel, water or similar liquids.



The switch mounts on a suction line and is wired into the power supply on electric motors, or the spark system on gasoline engines. When suction falls below a predetermined negative pressure (approximately 1″ mercury), the switch automatically cuts off the motor or gas engine.

The model for motor use will operate on electric motors up to 2 H.P. on AC current and ½ H.P. on DC. The gas engine model is designed to short out the spark plug in the event of liquid supply failure. A hand lever is incorporated on the switch for manual restart. ***Item 5.***

AMERICAN ENGINEER — MARCH
Department S
1121 15th Street, N.W.
Washington 5, D.C.
Closing Date, March 31, 1953

Plese send me { Free literature ☐ / Price information ☐ / More data ☐ } on circled items

1	2	3	4	5

Name ..... Title.....

Company .....

Street .....

City and Zone ..... State.....

Professional Directory

COLORADO

C. M. HATHAWAY
Consulting Engineer

Electrical—Mechanical—Electronic
Product Development—Project Engineering
Production Designs—Planning
Research—Model Work and Pilot Manufacturing

1315 S. Clarkson St. **Denver 10, Colo.**

FLORIDA

SOUTH FLORIDA TEST SERVICE
Testing—Inspection—Research—Engineers

Consultants and specialists in corrosion, weathering and sunlight testing.

4301 N.W. 7th Street **Miami 34, Florida**

GEORGIA

ROBERT AND COMPANY ASSOCIATES
Consulting and Designing Engineers

Industrial Plants—Municipal, Highway and Airport Improvements — Power Plants — Water Supply — Sewage and Industrial Waste Disposal — Appraisals — Reports.

Atlanta **Georgia**

ILLINOIS

CRESCENT ENGINEERING COMPANY, INC.
Contracting & Consulting Electrical Engineers

Design, Supervision and Construction
Process Power and Lighting for Industrial Plants

6455 S. Central Avenue, Chicago 38, Illinois

DeLEUW, CATHER & COMPANY
Consulting Engineers

Transportation, Public Transit and Traffic Problems
Industrial Plants, Grade Separations, Railroads, Subways, Power Plants, Expressways, Tunnels, Municipal Works

150 N. Wacker Drive **Chicago 6**
79 McAllister St. **San Francisco 2**

K. AUSTIN JEWELL
Consulting Industrial Hydraulic Engineers

Jewell Process
WATER PURIFICATION WORKS
WASTE TREATMENT WORKS
for
MINES, MILLS AND PLANTS

Transmission, Hydropower, Distribution, Drainage Plans, Specifications, Reports.

2125½ Ridge Avenue **Evanston, Illinois**

INDIANA

ALVA C. TODD
Consulting Engineer

Communication and Electronics

Brookston, Indiana

KENTUCKY

STEPHEN ARTHUR DERRY
Consulting Engineers

Management — Industrial — Civil
Management and Municipal Problems
PUBLIC RELATIONS
Profit Sharing — Project Engineering
Kentucky Home Life Bldg., Louisville 2, Ky.
Wabash 5667

MICHIGAN

COMMONWEALTH ASSOCIATES INC.
Consulting and Design Engineers

Power Generation
Electric—Gas—Water Systems
Industrial Planning

7 Hayes St. **Jackson, Michigan**

THE HINCHMAN CORPORATION
ENGINEERS

CORROSION ENGINEERING
surveys, designs, reports, specifications, economic evaluation
UNDERGROUND UTILITIES
location, mapping, electronic leakage surveys, electrolysis surveys, electrical grounding systems
ELECTRONIC DIRECTIONAL SURVEYS OF HOLLOW PILING

Francis Palms Building **Detroit 1, Mich.**

NEBRASKA

BACKLUND and JACKSON
Consulting Engineers

Architectural, Civil,
Municipal, Structural.

4924 Poppleton Avenue
Omaha 6, Nebraska

NEW JERSEY

ENGINEERING DRAFTING SERVICE
S. J. Ozimek—Consulting Engineer

Industrial Bldgs.—Mechanical—Structural—Electrical—Piping—Tools—Machine Design—Product Design—Electronics

38 Park Pl., Newark 2, N. J.

GREER & McCLELLAND
Consulting Engineers

FOUNDATION INVESTIGATIONS

98 Greenwood Ave. **Montclair, N. J.**
2649 N. Main St. **Houston, Texas**

W. W. SLOCUM & CO.
Engineers

Industrial Engineering
Complete Project Design
Management Engineering

National Newark Building
744 Broad St. **Newark, N. J.**

UNITED STATES TESTING COMPANY, INC.

Engineering Testing & Inspection
Development — Research — Consulting

Main Laboratories **Hoboken, N. J.**
Boston, Chicago, Dallas, Los Angeles, Memphis, New York, Philadelphia

NEW YORK

GEORGE H. ELLIOTT & COMPANY
Consulting Management Engineers

521 Fifth Avenue

New York 17, New York

KNAPPEN-TIPPETTS ABBETT-McCARTHY
Engineers

Ports, Harbors, Flood Control, Irrigation, Power, Dams, Bridges, Tunnels, Highways, Subways, Airports, Traffic, Foundations, Water Supply, Sewerage, Reports, Design, Supervision, Consultation.

62 West 47th Street **New York City**

MADIGAN-HYLAND
Consulting Engineers

28-04 41st Avenue

Long Island City, New York

PARSONS, BRINCKERHOFF, HALL & MACDONALD
Engineers

51 Broadway, New York 6, N. Y.

JAMES P. O'DONNELL
ENGINEERS

39 Broadway **New York 6, N. Y.**